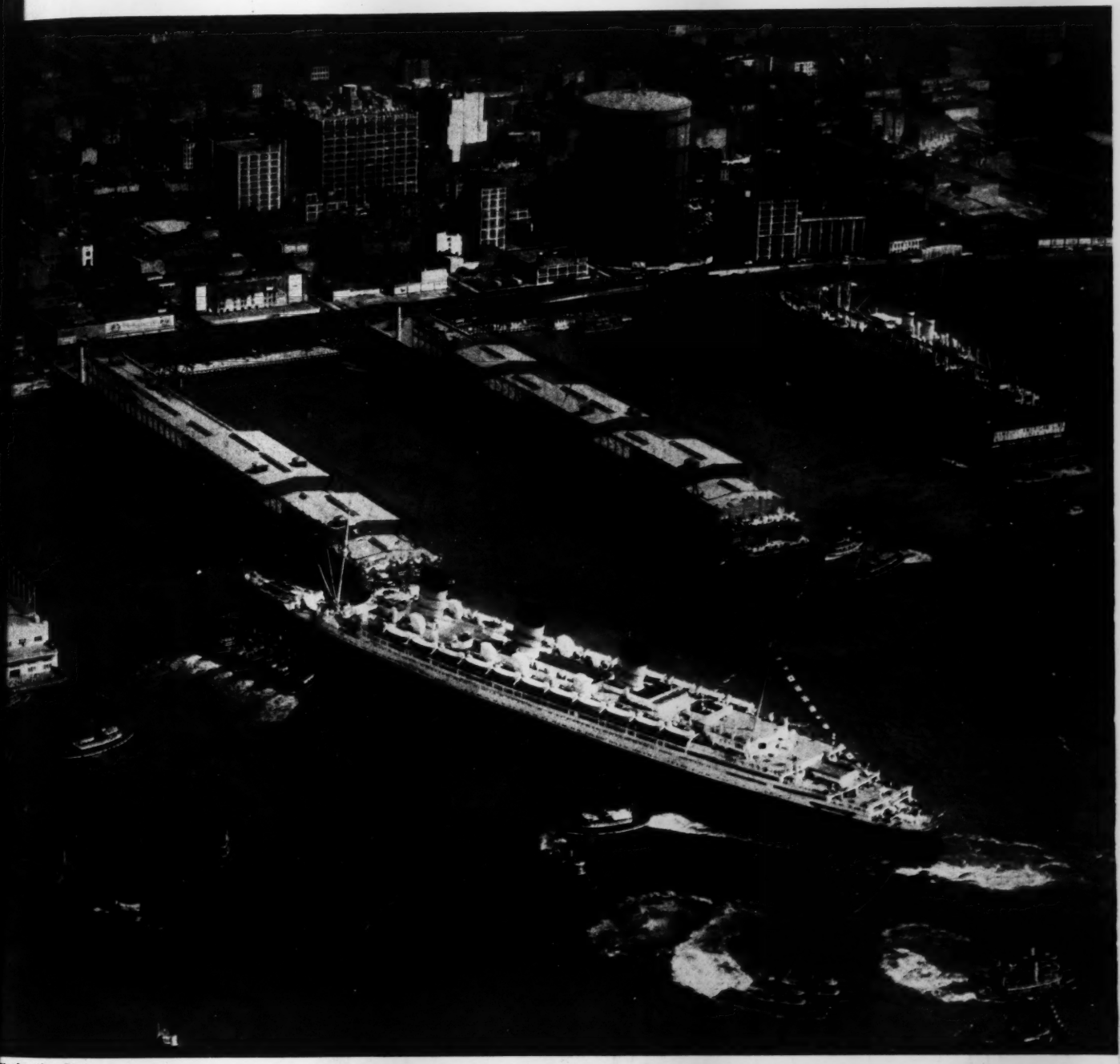
JUN 13 1936

Engineering News-Record

McGraw-Hill Publishing Company, Inc. June 11, 1936 Twenty-five Cents, Five Dollars per Year



Explorations Photo

Business begins at new 1,100-ft. pier as tugs nose the 1,020-ft. "Queen Mary" into her berth at New York's super-liner terminal, the most modern in the world.

HARD FACTS ON THE SHOW-DOWN:

"Caterpillar" Diesel Power means fuel costs cut 60 to 80%—engine maintenance down to a few cents an hour in spite of 24-hour-a-day operation, heavy and fluctuating loads.

"Caterpillar" Diesel Power is available in a wide range of sizes—from 44 to 160 maximum brake horsepower.

Vulcan Iron Works of Wilkes-Barre, Pa., is one of the more tha 40 manufacturers of powered equipment who have turned to th "Caterpillar" Diesel Engine for dependable, heavy-duty powe Their "Caterpillar"-powered equipment is setting records daily thanks to the low operating and maintenance costs that mak the "Caterpillar" Diesel the SHOW-DOWN on power. Caterpilla Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR

REG. U. S. PAT. OFF.

DIESEL

Is Efficiency a Liability?—II

(Continued from last week's issue)

IT IS TRUE, of course, that the immediate and local effect of some technical advance may be a temporary reduction in the number of a certain type of worker required to produce *the same output,* but sixty years of experience shows that this condition consistently is corrected by the increased output that results from lower costs and by the new varieties of crafts, trades and other employment that are called into being by the expansion of industry into new fields.

A larger production of automobiles, for example, made possible by more efficient methods, has made jobs for many more men than might have been displaced by the improvements applied to the old output only; and this is without the additional employment in the myriad new industries, trades and services that came into existence with the widespread use of the automobile.

CONSIDERING production as a whole, in 1930 some 398 workers per 1,000 inhabitants found employment producing the goods and services demanded by the consumers of this country as compared with only 324 per 1,000 immediately after the Civil War. This expanded employment plus the new machinery, new technique and higher efficiency so coldly dismissed by the President, has increased prodigiously the volume and variety of the commodities and services available for the comfort, convenience and luxury of the American people. If we set at 100 the 1870 indices of total population, number gainfully employed and the volume of trade, the corresponding values of these three items in 1930 were 318 and 378 and 1579 respectively. And by virtue of higher efficiency this increase in productivity was accompanied by a substantial decrease in the working time of those gainfully employed.

Unfortunately we are prone to take for granted and to overlook the vast aggregate of absolutely new employment that is created by technical progress and higher efficiency. This is of two kinds: one comprises the great variety of service and distributive functions that accompany the intensive development of industry. Transportation, wholesale and retail trade; merchandising, advertising and financing; insurance, telegraph, telephone and mails; professional and many other services create new jobs in abundance. A comparison of relative employment shows that from 1870 to 1930 manufacturing employees increased from 21.2 per cent to 28.9 per cent of the total, while agricultural decreased from 53.4 per cent to 21.4 per cent. But the number employed in distribution and services increased during the same period from 23.5 per cent to 47.2 per cent of the total.

Be it noted that this increase in the proportion of those employed in manufacturing, despite the vast use of modern technique and machinery, results from the second type of new employment, i.e., the wholly new industries developed by technical progress to provide the new goods and services required to gratify the desires of a people whose purchasing power has been increased by other technical progress.

If we examine the eighteen principal manufacturing industries that had no existence before 1879, we find employed by them in 1929 one-seventh of all the manufacturing labor. These include electrical machinery, motor vehicles, typewriters, aircraft, motion pictures, computing machines and many more. In 1879 there were 2,427,000 factory wage earners or 49,437 per million of population. In 1929 there were 8,839,000 or 72,731 per million. Here is an increase of 6,412,000 or 23,294 per million. But if we consider *only the eighteen new industries,* we find that in 1929 they alone employed 1,123,000 wage earners or 9,243 per million of population. This constitutes 18 per cent of the total increase and *40 per cent of the increased factory employment per million of population.* This includes only the factory workers; it disregards those who find employment in servicing these new products to users or consumers.

These *new* industries, with all that they mean to the lives of our people as well as to employment, never would have come into existence if during those fifty years the principles so warmly espoused by the President had dominated our industrial development.

NO ONE can deny that the swift pace of industrial progress creates serious problems for many workers whose resources are inadequate to tide them over its inevitable dislocations of employment. But the task of helping them must be seen for what it really is, i.e., a problem of reconditioning and reemployment to be dealt with jointly by industry and the community. It cannot be solved by any policy or program based on the absurd premise that "new machinery, new technique and increasing employee efficiency * * * mean fewer men employed and more men unemployed." That would carry us straight backward to a stage where men would have to labor much harder to enjoy far less.

Willard Chevalier

ENGINEERING NEWS-RECORD Published every Thursday. Vol. 116, No. 24. Price 25c. per copy. Subscription, domestic, Canada, Mexico, Central and South American countries, $5 per year. All other countries $9 a year or 36 shillings. Entered as second-class matter April 11, 1917, at the Post Office at New York, N. Y., under the Act of March 3, 1879. Printed in U.S.A. Cable Address "McGrawhill, New York." Member A.B.P. Member A.B.C.

Copyright 1936 by McGRAW-HILL PUBLISHING COMPANY, INC., 330 WEST 42d STREET, NEW YORK, N. Y.

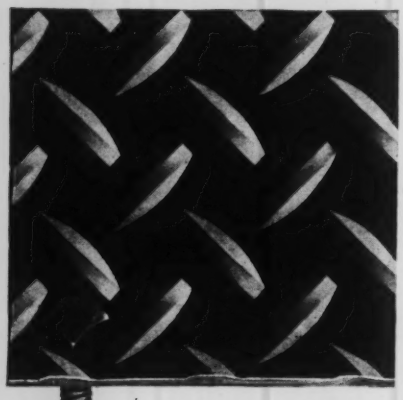
Editorial and Publishing Offices: 330 West 42d St., New York; 520 N. Michigan Ave., Chicago; 883 Mission St., San Francisco; Aldwych House, London, W.C. 2, England
Branch Offices: Washington; Philadelphia; Cleveland; Detroit; St. Louis; Boston; Atlanta, Ga.

JAMES H. McGRAW, JR., Chairman — MALCOLM MUIR, President — JAMES H. McGRAW, Honorary Chairman
WILLARD CHEVALIER, Vice President — B. R. PUTNAM, Treasurer — D. C. McGRAW, Secretary

Table of Contents—See Page 25

Stop This

....with Inland 4-Way Traffic Plates



Safety is one reason why Inland 4-Way Traffic Plates (patented) have been applied to so many bridges. The other reason is that 4-Way Plates restore an old bridge floor to serviceable condition —lengthening its life several years at low cost.

On the Inland 4-Way pattern, projections center one another at right angles. 4-Way grip—secure traction, safety against side skid. The thorough drainage of 4-Way Plates is also a safety factor in bad weather.

Projections on 4-Way Plates overlap one another both lengthwise and crosswise. This reinforces the plate, makes it just as stiff and strong lengthwise as it is crosswise—extra reinforcement for the bridge floor.

Inland 4-Way Traffic Plates are made in widths, lengths, and thicknesses for all highway requirements. Complete information mailed on request. INLAND STEEL COMPANY, 38 S. Dearborn St., Chicago, Ill.

INLAND STEEL

Sheets Strip Tin Plate
Plates Structurals Piling
Rails Track Accessories
Bars Rivets Billets

ENGINEERING NEWS-RECORD

McGraw-Hill Publishing Co., Inc. Editorial and Publishing Offices: 330 West 42d St., New York

Editorial Staff
V. T. Boughton
W. G. Bowman
Chicago
W. W. De Berard

F. E. Schmitt, *Editor*

Willard Chevalier, *Vice-President*

Editorial Staff
C. S. Hill
H. W. Richardson
E. J. Cleary
San Francisco
N. A. Bowers

CONTENTS

Volume 116 Number 23 Copyright 1936

June 11, 1936

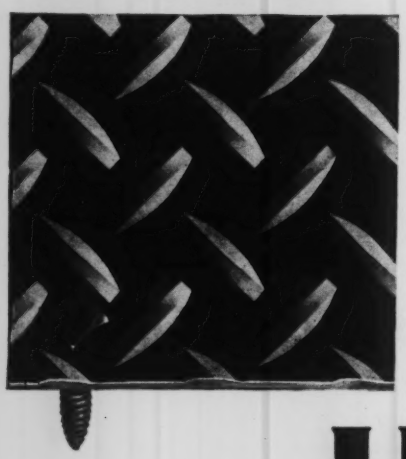
Airport Lawn Maintenance		833
Wear on Sheepsfoot Rollers		835
Flood Flow Comparisons		836
Regulating Transport—I	*John S. Worley*	837
Tunnel Lining Pumped From Surface	*Emory D. Roberts*	839
Excessive Bridge Deck Maintenance	*James L. Davis*	841
Frost Takes Toll of Roads—II		842
Bridge Redecked With Open Grating	*H. S. Ayres*	845
The Uses of Preferred Numbers	*Robins Fleming*	846
Flush Wave Velocities	*E. W. Lane* and *O. J. Baldwin*	848
Welded Girder Cantilever in Japan		849
Overtopping Caused Elk City Dam Failure		850
Precasting Record-Size Pipe		852

Letters to the Editor	855
Editorials	856
Current News	858
New Equipment	864
Unit Prices	865

Midnight Oil, Airmail and Telegraph— Next Week's staff report of the A.W.W.A. convention, now being held in Los Angeles, will require the use of all three in order that readers may have the prompt service they have come to expect.

Stop This

. . . . with Inland 4-Way Traffic Plates



Safety is one reason why Inland 4-Way Traffic Plates (patented) have been applied to so many bridges. The other reason is that 4-Way Plates restore an old bridge floor to serviceable condition —lengthening its life several years at low cost.

On the Inland 4-Way pattern, projections center one another at right angles. 4-Way grip—secure traction, safety against side skid. The thorough drainage of 4-Way Plates is also a safety factor in bad weather.

Projections on 4-Way Plates overlap one another both lengthwise and crosswise. This reinforces the plate, makes it just as stiff and strong lengthwise as it is crosswise—extra reinforcement for the bridge floor.

Inland 4-Way Traffic Plates are made in widths, lengths, and thicknesses for all highway requirements. Complete information mailed on request. INLAND STEEL COMPANY, 38 S. Dearborn St., Chicago, Ill.

Sheets Strip Tin Plate
Plates Structurals Piling

INLAND STEEL

Rails Track Accessories
Bars Rivets Billets

ENGINEERING NEWS-RECORD

McGraw-Hill Publishing Co., Inc. Editorial and Publishing Offices: 330 West 42d St., New York

Editorial Staff
V. T. Boughton
W. G. Bowman

Chicago
W. W. De Berard

F. E. Schmitt, *Editor*

Willard Chevalier, *Vice-President*

Editorial Staff
C. S. Hill
H. W. Richardson
E. J. Cleary

San Francisco
N. A. Bowers

CONTENTS

Volume 116 Number 23 Copyright 1936

June 11, 1936

Airport Lawn Maintenance		833
Wear on Sheepsfoot Rollers		835
Flood Flow Comparisons		836
Regulating Transport—I	*John S. Worley*	837
Tunnel Lining Pumped From Surface	*Emory D. Roberts*	839
Excessive Bridge Deck Maintenance	*James L. Davis*	841
Frost Takes Toll of Roads—II		842
Bridge Redecked With Open Grating	*H. S. Ayres*	845
The Uses of Preferred Numbers	*Robins Fleming*	846
Flush Wave Velocities	*E. W. Lane* and *O. J. Baldwin*	848
Welded Girder Cantilever in Japan		849
Overtopping Caused Elk City Dam Failure		850
Precasting Record-Size Pipe		852

Letters to the Editor	855
Editorials	856
Current News	858
New Equipment	864
Unit Prices	865

Midnight Oil, Airmail and Telegraph— Next Week's staff report of the A.W.W.A. convention, now being held in Los Angeles, will require the use of all three in order that readers may have the prompt service they have come to expect.

Somebody's going to get a roof that will *last longer*

METAL roofings give the most satisfactory protection of any roofing products on the market. When constructing a new building it is good to have the assurance that the roof will *last*. And when the time comes to repair the roof of an older building, metal roofings will put off the time when the job will have to be done over again. For best and most uniform results be sure to specify USS high grade Copper Steel terne plates, or galvanized roofing products, made by the subsidiaries of the United States Steel Corporation.

Our galvanized sheets for all construction uses have a well established reputation for quality and service. American roofing terne plates are furnished in several grades, from 8 pounds to 40 pounds coating, and the weight is stamped plainly on each sheet. In the manufacture of these galvanized sheets and roofing terne plates every process is marked by the greatest care and skill known to the metal industry.

Specify USS *Copper Steel* ROOFING PRODUCTS

CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago*
With which has been consolidated American Sheet and Tin Plate Company
TENNESSEE COAL, IRON & RAILROAD COMPANY, *Birmingham*
COLUMBIA STEEL COMPANY, *San Francisco*
United States Steel Products Company, New York, *Export Distributors*

UNITED STATES STEEL

ENGINEERING NEWS-RECORD

June 11, 1936

FIG. 1—SWAN ISLAND AIRPORT as seen from a plane. The entire area except the runways is in lawn. Circular spots in foreground mark areas wet by sprinklers.

Maintaining Airport Lawn

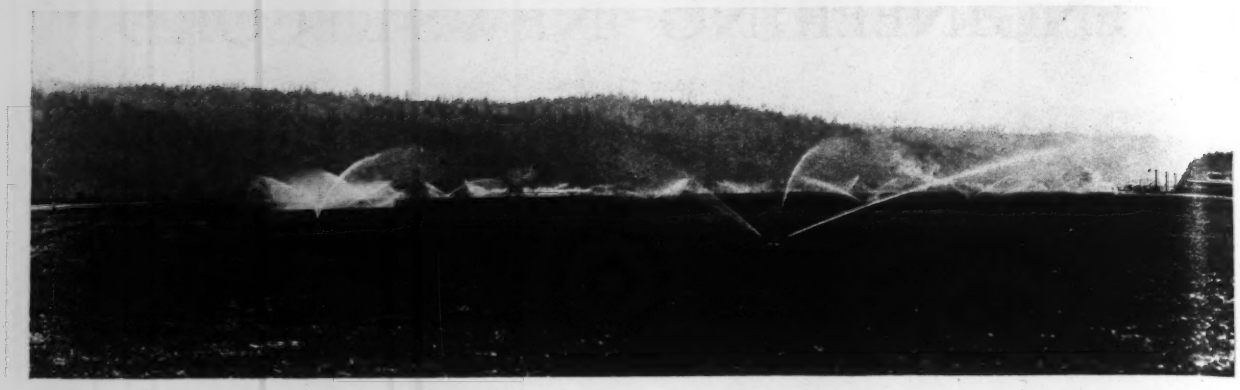
Grass turf on entire 195 acres of Po rtland, Ore., airport is served by an extensive sprinkler system—Mowing and watering cost $5,100 annually.

LAWNS that are green the year 'round lend all the attractiveness of a park to the municipal airport on Swan Island in the Willamette River at Portland, Ore. Perhaps more important than appearance is the fact that the grass completely eliminates the dust nuisance. The entire landing field area, except for the hard-surfaced runways, was seeded to lawn because climatic conditions are such as to require sprinkling during only one-third of the year and abundant water is available in the river with only a low pumping head. Under these favorable conditions the entire cost to the city for maintaining the lawn area of 195 acres has been only about $5,000 per year or $26.26 per acre. These costs do not include any charge for rental of equipment such as tractors, mowing machines, etc. (because these machines are city property used also on other work) but it does include a part of their upkeep cost proportional to that part of the time they were used at the airport. If rental charges were added the annual cost would be increased about $4 per acre, to a total of about $30.

The entire grass area, both in the field and on the outside of the road, is irrigated during the summer months. Automatic sprinkling systems were installed to take care of the sown areas outside the road, using a standard automatic sprinkler head. Such heads are not practical on the field, however, because of danger to the system or to planes. Hence a manual sprinkling system was installed, using whirling sprinklers mounted on a sled base. Each sprinkler is served by a 100-ft. length of 1-in. hose connected to a rubber hose nipple instead of to a rigid pipe nipple. It was found economical to use the best rubber hose available for these nipples. The control valves are below ground protected by a concave casting, thus providing protection against damage to planes or to the sprinkling system as a result of the tail skid or wheels of a plane striking a pipe connection.

The mains serving the field are 6 in. in diameter; laterals range from 2 to 3½ in. in diameter according to the distance from the mains. Two mains were laid, one to serve the upper end of the field and one the lower end. Laterals are laid parallel to the main runways and are spaced 200 ft. apart, with risers 200 ft. apart in all directions. This arrangement makes it possible to cover the entire area conveniently with whirling sprinklers on 100-ft. lengths of hose. Attendants move the sprinklers as required, advancing the connection to the next riser as each area is sufficiently watered. Ordinarily 51 whirling sprinklers are in operation at one time; one man can attend effectively to moving and changing connections on this number of sprinklers.

The water supply is taken from the river by a 14-in., five-stage, deep-well pump driven by a 100-hp. motor. Operating at 1,750 r.p.m., this pump delivers 1,000 gal. per min. against a pressure of 100 lb. per sq.in., pumping directly into



pressure mains. The underground piping system for field sprinkling cost about $200 per acre and the total cost of the sprinkling system, pumping unit, sprinklers and other equipment used in this connection was $50,000, or about $261 per acre.

The first part of the airport to be seeded was that at the southerly end of the island, where an area of 55 acres was sown in October and November of 1928. The soil in this area was better than in other parts of the island because it has a high percentage of clay and less of sand; the top soil here is almost a pure clay, dredged from the river bottom and floated on the island fill in a soupy form by ordinary dredging methods. After it had dried out, the surface was worked with ordinary farm implements and teams and at the same time was graded and crowned. In seeding this area a mixture of nine different kinds of seed was used and a total of 44 lb. of seed per acre was sown. This seeding was entirely satisfactory and the area has been kept green during eight years without any need for reseeding. Detailed costs of developing the turf are given in Table 1.

TABLE 1—COST PER ACRE OF DEVELOPING GRASS TURF

LABOR:		
Cultivating and seeding	$34.61	
Tractor operation	28.25	
Engineering and Supervision	5.19	
Total labor cost per acre		$68.05
MATERIAL:		
Grass seed	$37.90	
Fertilizer	21.85	
Team hire	99.00	
Total material cost per acre		158.75
Total cost per acre		$226.80

Fig. 2—ROTATING-JET SPRINKLERS in operation on the Portland airport.

The year 1935 was typical with respect to sprinkling costs. Sprinkling started on May 9 and was continued until Sept. 13, a total of 127 days. During this time three men were employed exclusively in moving and changing connections on the sprinklers; that is, these men worked in relays of 8 hr. each to maintain 24-hr. sprinkling. The cost of sprinkling and maintaining sprinkler equipment for the 127-day period is given in Table 2. Sprinkling and maintenance costs per acre are given in Table 3. These figures cover a total pump operating period of 2,224 hours (an average of 17½ hours per day), during which time the cost per hour for electrical energy and supplies for the pump totaled $1,064. Meters indicated that the total quantity of water pumped to lawns and fields during this period was 133,470,000 gal. or about 1.05 m.g.d.

Surface drainage conditions on the Swan Island airport are said to be ideal. The top soil was graded to a slope of ¼ to ½ of 1 per cent from the center of the field, and care was taken to avoid any pockets that would retain water. The deep sandfill below the turf immediately absorbs rainfall. Along the sides of the runways, paved areas and roads a system of tile drains was put in when the airport was constructed. These drains are designed to take storm water at a maximum precipitation rate of 1 in. per hour. This has proved to be ample in the Portland district either for rain or for melting snow. The total cost of the drainage system was $22,000.

The Swan Island airport is a municipal property under the supervision of the Port of Portland, James H. Polhemus, general manager.

TABLE 3—ANNUAL COSTS PER ACRE OF SPRINKLING AND MOWING

SPRINKLING:		
Labor	$6.99	
Electrical energy	11.87	
Miscellaneous supplies	3.33	
Total sprinkling cost per acre		$22.19
MOWING:		
Labor	$3.43	
Supplies, gasoline and lub. oil	.64	
Total mowing cost per acre		4.07
Total cost per acre		$26.26

TABLE 2—TOTAL ANNUAL COST OF SPRINKLING AND MOWING 195 ACRES

SPRINKLING GRASS AREAS:		
Labor, moving hose and sprinklers at 40c. per hr. (2,338 hr.)	$935.20	
Labor, moving hose and sprinklers at 62c. per hr. (649½ hr.)	402.61	
Labor, repairing hose and sprinklers at 40c. per hr. (65 hr.)	26.00	
		$1,363.81
MOWING GRASS AREAS:		
Labor (1 man, Fordson and power mower), 1,080 hr. at 62c.	$669.60	
614 gal. gasoline, 18c. per gal.	110.52	
31 gal. lubricating oil, 50c. per gal.	15.50	
		795.62
Cost of energy for 100-hp. pump motor	$2,314.53	
Cost of supplies for pump	51.72	
Cost of supplies, new hose, fittings, sprinklers, etc.	597.43	
		$2,963.68
Total		$5,123.11

Modern Home Building Demonstration Extended

IN CONTINUATION of an effort launched last year to demonstrate the value of scientifically-planned homes, a new demonstration program for 1936 has been announced by the General Electric Co. The company itself will build no houses but will sponsor a cooperative movement of material and equipment manufacturers, architects, builders, and other related groups. A field organization of 170 local committees will handle the administrative details of the plan. The 1936 program will differ slightly from that of 1935. Magazines interested in home making will provide original house plans from which builders may make a selection. Builders, however, will not be limited to the house plans made available by the magazines, but may use plans produced by a local architect.

The 1935 program grew out of an architectural competition sponsored by the General Electric Co., in which 9,000 architects competed in the design of medium-sized houses. More than 300 homes were built under the 1935 program and it is expected that about 400 will be built under the 1936 program.

The plan will be carried on as an activity of the recently formed General Electric Home Bureau, New York, of which C. M. Snyder is manager. J. F. Quinlan, manager of the 1935 program, will again be in direct charge.

Wear on Sheepsfoot Rollers

Stony earth fill for San Gabriel Dam No. 1 for Los Angeles county flood control requires no replacements of tamping feet on extra-diameter rollers

By Paul Baumann

Junior Assistant Chief Engineer, Los Angeles County Flood-Control District, Los Angeles, Calif.

IN PLANNING the compaction of the stony soil used in constructing San Gabriel Dam No. 1 by the Los Angeles County Flood Control District it was realized that wear on the feet of the petrolithic rollers would be excessive unless the design was modified. Accordingly, particular attention was given to this problem and equipment was built which differs in several respects from that ordinarily supplied as standard. The drum diameter was increased to give the individual feet a more-nearly directly-vertical punch, the shape of the foot was redesigned to make it suitable to the new roller diameter and the space between feet was made somewhat greater than usual. Despite the sharp, rocky material compacted, the wear on the feet after several months of operation has not been enough to require any replacements, and the required compaction has been exceeded.

The standard petrolithic rollers, which manufacturers stock, have drum diameters of 42 in., overall lengths of 58 in. and about 78 teeth between 7 and 8 in. in length, set in 13 diagonally-spaced rows, 6 teeth to the row. The dead weight of these stock drums is about 4 tons each and the bearing area of each foot is about 7 sq.in.

The tampers designed by the district have a drum diameter of 60 in., a 60-in. length and 108 teeth per drum arranged in 36 staggered rows of 3 teeth each. The dead weight of each drum is 6½ tons which is increased to 11½ tons by filling it with saturated sand. The bearing area of each tooth is 11¼ sq.in. Small T-bars were welded inside the drums so that lead could be cast in as a lining if necessary to increase the weight by a still heavier filling. However, this has not been necessary; loaded with wet sand the drums have given the required dry density of fines (120 lb. per cu.ft. minimum) after eight trips of the tamper. In fact, this number of trips usually gives 10 to 15 per cent more than the required compaction.

The problem of special design was approached with the idea that the ratio of length of teeth to the radius of the drum has a definite bearing on the rate of wear on the feet. With rollers of the standard dimensions mentioned, this ratio is about 0.365 as compared to 0.265 on the rollers designed by the district. The influence of this ratio on wear is best visualized by considering the two extremes, namely, a roller with a very small drum and one with a very large drum. In the first case the action of the feet simulates that of a hammer mill; the feet enter the material in an almost horizontal position and with progressing compaction the roller will be slightly lifted each time the feet pass through the lowest position. The reaction caused by this lifting is the primary cause of wear at the heel. A very large drum, on the other hand, will reduce this lifting action and, correspondingly, the wear of the heels is very much less.

Since the rollers were put in use, about the first of the year, the feet have shown little wear—not enough to require any replacements. The feet are made of cast steel, S.A.E. specifications

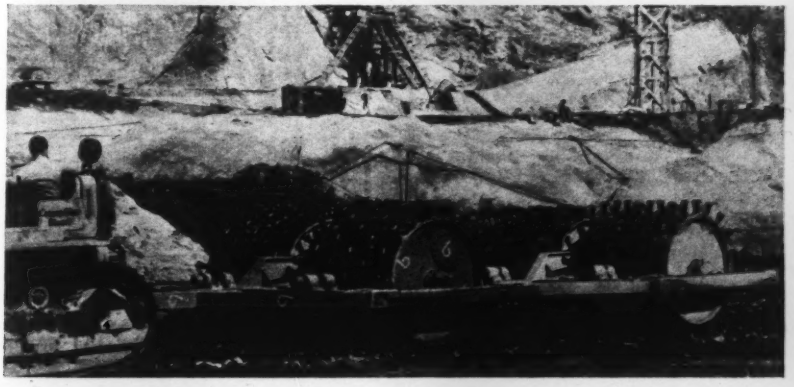


FIG. 1—TANDEM ROLLER units having four drums and weighing 46 tons are drawn by 95-hp. tractors, in compacting fill for San Gabriel Dam No. 1, Los Angeles county flood-control district.

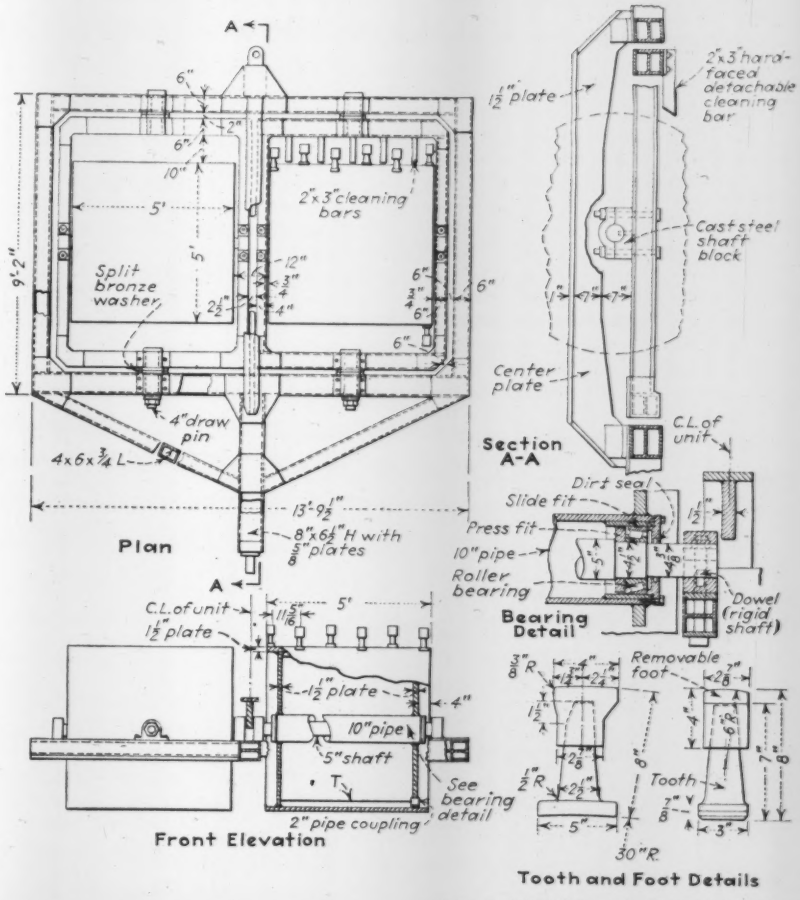


FIG. 2—DETAILS of the large sheepsfoot roller used on San Gabriel Dam No. 1.

4140 or equal, and were heat treated to a uniform hardness of at least 450 Brinell. The feet are easily replaceable on teeth which are rigidly welded to the drums.

One of the novelties in the design of the rollers is the internal main bearings shown in the accompanying drawing. This arrangement of bearings permits the twin drums to be set close together and by putting a row of feet flush with the inner end of each cylinder, a uniform spacing of feet is maintained across a pair of rollers. Thus, the usual untamped central strip between a pair of rollers does not occur with this design. Roller bearings are used, fitted to a heavy shaft which does not rotate. This arrangement helps to keep the main bearing free of dirt and permits efficient lubrication. The axles are 5 in. in diameter, made of cold rolled steel of shafting quality. All bearings are supplied with pressure connections for lubrication.

Each drum is supported on a tilting frame which permits the individual drums to adjust themselves to the unevenness of the ground. This is a particularly important feature where rock up to 9 in. in diameter is being rolled as on this job. The tilting frames, in turn, are supported by the main frame designed as a rigid, continuous structure heavily braced at the drawbar end.

The rollers are used in tandem and as each pair (loaded with wet sand) weighs 23 tons the total load to be drawn by the tractor is 46 tons. With this load a 95-hp. tractor makes an average speed of about 1.6 miles per hour.

The general dimensions of the tampers were worked out by C. H. Howell, chief engineer of the Los Angeles County Flood-Control District. Fred Schulhof, of the design department, was the originator of most of the mechanical details.

Flood Flow Comparisons

THAT FLOODS on Eastern rivers during March, 1936, would approach all-time records was indicated at first by incomplete reports from the stricken districts, as published in the March 19 and 26 issues of *Engineering News-Record*. The predictions were fully justified by more complete and revised figures which show that a number of rivers far exceeded previously recorded figures that in one instance extended back to 1763. Heavy rains, during the middle part of March, fell on the exceptionally deep ice and snow blanket that still remained in the Northeastern states and sent the rivers out of their banks causing widespread damage. The major streams affected were the Ohio, the Connecticut, the Merrimack, Androscoggin, Kennebec and Penobscot.

Peak stages and discharges on various rivers that were affected during the spring floods are shown in the following table, prepared from records collected by the U. S. Geological Survey. The drainage areas include some of those on which flows were affected by storage. The effect of such storage on the maximum flood discharges has not been determined, but is considered as probably being comparatively small, although it is estimated that the Sacandaga Reservoir reduced the flow of the Hudson River by 50,000 sec.-ft. Later data may make it necessary to revise determination of discharges in some instances.

PEAK STAGES AND DISCHARGES OF THE MARCH 1936 FLOODS

River	Point	Drainage Area (Sq. Mi.)	Stage (Ft.)	Discharge (Sec.-ft.)	Discharge Sec.-ft. per Sq. Mi.	Date of Record	Previous Known High Stage (Ft.)	Previous Known Maximum Discharge (Sec.-ft.)	Date of Previous Record
Kennebec	Waterville, Me	3,030(a)	....	145,000	48	3/20/36	.....	157,000	12/16/01
Androscoggin	Runford, Me	2,090	....	75,000	36	3/21/36	....	55,200	April, 1895
	Gulf Island, Me	.....	....	149,000(b)	66	3/19/36	....	65,000	1896
Saco	West Buxton, Me	1,572	....	80,000	51	3/22/36	....	27,800	5/ 2/23
Merrimack	Lowell, Mass	3,979	67.6	165,000	41	3/20/36	64.2	104,000	4/23/1852
Pemigewasset	Plymouth, N. H	622	29.0	65,800	106	3/19/36	27.4	60,000	11/ 4/27
Blackstone	Woonsocket, R. I	416	14.4	13,400	32	3/19/36	14.0	12,910	11/27
Shetucket	Willimantic, Conn	401	18.3	16,000	40	.....	11.7	10,800	3/ 6/34
Quinnebaug	Jewett City, Conn	712	24.0	24,000	34	.....	17.0	13,100	.....
Connecticut	White River Junction, Vt.	4,068	30.7	107,000	26	3/20/36	35.0	131,000	11/ 4/27
	Montague City, Mass	7,840	49.3	218,000	28	3/20/36	42.7	171,000	11/ 5/27
	Springfield, Mass	.....	28.6	.....	..	.....	22.4	.....	1927
	Thompsonville, Conn	9,637	16.7	285,000	30	3/20/36	12.3	199,000	11/ 6/27
	Hartford, Conn	10,600	37.5	300,000	28	.....	29.5	.....	.....
Housatonic	Falls Village, Conn	644	17.4	15,000	23	.....	15.7	11,700	11/ 5/27
Hudson	Hadley, N. Y	1,664	19.6	42,200	25	3/18/36	19.7	33,100	4/12/22
	Mechanicsville, N. Y	3,456(d)	....	84,300(e)	24	3/19/36	....	120,000(f)	3/28/13(f)
	Albany, N. Y	.....	17.7	200,000(e)	..	.....	21.45	240,000(f)	1913(f)
Mohawk	Cohoes, N. Y	3,456	22.6	130,000	38	3/19/36	....	140,000(g)	3/14
Delaware	Riegelsville, N. J	6,340	29.8	185,000	29	3/21/36	35.9	275,000	10/11/03
Tioga	Erwins, N. Y	1,370	....	59,800	44	3/12/36	....	46,900	7/35
Chemung	Chemung, N. Y	2,530	....	84,600	33	3/36	....	83,400	7/35
Chenango	Binghamton, N. Y	1,492(g)	26.96	35,500(h)	24	3/18/36	24.80	82,800(h)	7/8/35
Susquehanna	Conklin, N. Y	2,240	....	62,100	28	3/18/36	18.3	52,000	3/28/13
	Binghamton, N. Y	.....	22.85	.....	..	3/18/36	19.74	.....	3/ 3/02
	Towanda, Pa	7,797	25.03	188,000	24	3/36	25.0	188,000	3/17/1865
	Wilkesbarre, Pa. (c)	9,960	33.07	.....	..	3/36	33.1	.....	3/18/1865
	Danville, Pa. (c)	11,220	27.9	.....	..	3/36	26.07	305,000	3/ 3/02
	Harrisburg, Pa	24,100	30.33	740,000	31	3/36	26.8	699,000	6/2/1889
West Branch-Susquehanna	Lock Haven, Pa.(c)	3,338	32.28	.....	..	3/36	29.8	.....	1889
	Williamsport, Pa	5,682	33.57	313,000	55	3/36	33.5	311,000	6/1/1889
Juniata	Newport, Pa (c)	3,354	34.24	.....	..	3/36	35.9	.....	1889
Potomac	Bloomington, Md	287	16.0	50,000	174	3/36	20.3	75,000	3/23/24
	Cumberland, Md	875	29.1	85,000	97	3/36	29.2	84,500	1889
	Hancock, Md	4,070	47.6	190,000	47	3/36	39.7	130,000	5/1889
	Sheperdstown, W. Va	5,936	42.1	280,000	47	3/36	39.2	240,000	1889
	Point of Rocks, Md	9,651	41.3	340,000	35	3/36	40.2	320,000	6/2/1889
	Chain Bridge, D.C	11,600	44.0	460,000	40	3/36	43.3	420,000	1889
Cacapon	Great Cacapon, W. Va	670	29.0	70,000	104	3/36	21.0	39,000	1889
North	Burketown, Va	381	24.1	.....	..	3/36	22.5	.....	5/24
James	Cartersville, Va	6,240	28.80	138,000	22	3/36	26.7	106,000	12/01
Ohio	Pittsburgh, Pa	19,100	46.0	640,000(i)	34	3/36	41.1	.....	3/9/1763
	Huntington, W. Va	.....	57.08	520,000	..	3/28/36	64.2	.....	1913
Kiskiminitas	Avonmore, Pa	.....	47.23	.....	..	3/36	30.8	.....	1908
Stony Creek	Johnstown, Pa	.....	30.26	.....	..	3/36	(j)	.....	1889
Blacklick Creek	Blacklick, Pa	.....	15.88	.....	..	3/36	12.9	.....	1912
Loyalhanna Creek	New Alexandria, Pa	.....	20.96	.....	..	3/36	16.0	.....	1935

(a) Does not include 1,240 sq.mi. above outlet of Moosehead Lake.
(b) At gaging station below Lewiston.
(c) Discharge not yet determined.
(d) Does not include 1,044 sq.mi. above Sacandaga Reservoir.
(e) It is estimated that Sacandaga Reservoir reduced flow at least 50,000 sec.-ft.
(f) Before construction of Sacandaga Reservoir.
(g) At Vischer Ferry Dam about 12 mi. upstream.
(h) At Chenango Forks, about 12 mi. upstream.
(i) Preliminary figures—U. S. Engineers.
(j) Reported to have been slightly higher than March, 1936.

REGULATING TRANSPORT—I

Reflections on the bedeviled business of moving people and goods about their affairs in a modern civilization

By John S. Worley
Professor of Transportation Engineering, University of Michigan, Ann Arbor, Mich.

FEW INDUSTRIAL ACTIVITIES have been the victims of more buncombe in speech and written word than has transport.

Commissions and committees, legislators and lobbyists have woven circles of dialectics around transport economics until the light of fact and logic has been almost hidden. To clear away some of the fog we have asked an independent student of transportation to give his reflections on transport and its management.

These reflections, the first of which are published in this issue, are certain to provoke disagreement. Their sanity is needed, however, and the reader will find them helpful as a palliative to bias and propaganda. In no sense do the articles pretend to be a treatise on regulating transport. —EDITOR.

An Imaginary Problem

IT IS UNNECESSARY to go into detail to emphasize the importance of transportation to our modern civilization. Nor is circumstantial description of the various agencies necessary; they are enumerated in the accompanying table with figures of their gross business and income. These figures are for a previous year but they have not changed enough since 1932 to affect general conclusions as they will be developed. Now what of this business that represents an investment of over $85,000,000,000 exclusive of communications and ocean-port facilities?

What is the problem?

1. Alarming assertions are made that a national transportation problem confronts America.

With all other industries, transportation was affected by the economic debacle of 1929, and those in charge of transportation agencies had no more understanding of, nor were more able to cope effectively with the situation, than were other business men. The confusion and stress in the period following 1929, of which there is no intelligent explanation, gave rise to the statement that we are confronted with a national transportation problem.

This idea has since become so thoroughly implanted that some of our most prominent scholars and students are speaking of and writing about "the transportation crisis" and "revolution." They speak of the deplorable and alarming condition of affairs affecting all carriers to the extent that transportation is suffering from a complication of diseases and other unfavorable conditions, that must be removed if a "cure" is to be complete and lasting. Further, it is stated, superficial manifestations are receiving our attention mostly, while we should be looking for fundamental causes.

A great variety of causes are quoted as having been responsible for the alleged debility of transport, among them being the failure to coordinate existing facilities, the lack of integration of a national system, the participation of government in the transportation business, the intense competition of different agencies, the inconsistent policies of federal regulation, the inadequate federal or state regulation, the regulation of certain kinds of carriers without regulation of others, and the economic depression.

The cure of the trouble and the way to end the alleged transportation crisis, is variously asserted to be coordination, integration, equality of opportunity, uniform regulation of every type of transportation, consolidation, elimination of subsidies, unification, reorientation, economic parity, a new transportation policy, and government ownership.

Truly we are bedeviled by those who think every social question is a problem and a crisis, and who can discuss it only in these terms and seek relief only through legislation and regulation.

Examining the question

2. An inquiry fails to verify the claim that there is a national transportation problem.

Painstaking examination of all the available material did not disclose any causative facts except the chaos, confusion and stress of the time. The inquiry not being productive of tangible information, it becomes necessary to study fundamentals—to examine the nature of those transport elements affected by the greatest public interest, the absence of which would create a transportation problem.

Adequacy of Service—First among those elements is the adequacy of each transportation agency, air, water, highway and railway, and the adequacy of the composite whole. If facilities are not available and the social, economic and political life of the people is suffering because of the inadequacy, the first corrective step is to provide that which is lacking. Some measure of guidance can be had by comparing the facilities of the last few decades with those of today, from which it appears that there are available to the country at large and to each individual wherever located more abundant means of transportation than ever before. As far as we have been able to

GROSS REVENUE OF ALL TRANSPORTATION AGENCIES IN THE UNITED STATES IN 1932

	Ton Miles (000)	Per cent	Gross Revenue	Per cent
Steam railways	235,308,521	80.15	$3,168,537,000	83.03
Great Lakes	24,733,878	8.43	11,733,099	.31
Pipe lines (oil)	19,600,000	6.68	211,788,647	8.55
Intercity truck for hire	5,457,600	1.86	164,728,000	4.32
Inland waterways	7,904,910	2.69	8,572,965	.22
Electric railways	583,260	.19	70,865,505	1.86
Intercity bus	.....	.....	171,200,000	4.49
Airway	.....	.....	8,600,000	.22
Total	293,588,169	100.00	$3,816,025,216	100.00

Information with reference to ton miles was taken from Mr. Eastman's Report Senate Document 152, p. 3, excepting for intercity trucks for hire which were obtained from p. 262 of the same report. Gross revenues were obtained from I.C.C. reports, excepting intercity motor bus which was obtained from the National Automobile Chamber of Commerce Facts; airways, which was obtained from Mr. Eastman's Traffic Report, p. 177; and intercity motor trucks which is estimated at 3c. per ton mile.

ascertain there are no complaints about the inadequacy of any one group or of all. As a rule the individual has one adequate facility and often a choice of two or more means of transportation.

Quality of Service—There being ample facilities, the next question is the quality of service. The quality of passenger transportation service is higher than in any period of our history. Railway trains are moving at greater speeds; tracks are maintained in better physical condition; cars are luxurious, many being air conditioned, and trains are safeguarded by the most modern type of signaling and automatic train control. In aviation great improvements have been made: Where five years ago cabins were small, seats were narrow and uncomfortable, passage was rough and the hazard of flying was great, today the cabins are commodious, with comfortable seats, riding is smooth and safety is very much improved. Five years ago the flying schedule from New York to Los Angeles was about two days—at present it is over-night.

For many decades there has been but little passenger travel by water, however, today such service as is rendered is equal to that of any past period. The automobile has been greatly improved in comfort. Five years ago 250 miles was the average maximum journey for a private passenger car, while today this has moved up to 500 miles. Equal improvement has been made in motor-bus transportation. All passenger vehicles have been greatly improved in their riding qualities, speed and safety of operation.

The criteria of service in shipping goods always have been the promptness with which the goods are moved and their arrival at destination without damage. This is a service which has received constant attention and has been continuously improving. Today, upon request, railway officials will promptly place at the disposal of the shipper whatever type of car is needed for the movement of freight. In many of the larger cities provision is made for picking up at the shipper's place of business small shipments which are expeditiously delivered to a customer in some distant city. The demand of merchants and manufacturers that their inventories be kept at a minimum has caused the railways to establish fast freight runs whereby goods may be consigned to the railway as late as four o'clock in the afternoon and be delivered to a customer in a town three or four hundred miles away by nine o'clock the following morning.

The shipment of goods by motor trucks, while of very small volume, has always been prompt and with a minimum amount of damage. Industries which are not located on a main or spur track of a railroad, planning their business activities with exactness in the matter of inventories, have found that the motor truck is able to furnish them a freight service which meets their requirements. Many industries have their schedules so arranged that raw materials or part-finished goods are received by truck with such clock-like precision that, although with practically no inventory on hand, their operations are not interrupted. While the freight movement by motor truck compared with the total freight movement in the United States is very small it is of great value where used.

Shipping by inland waterways is small but the service is reasonably satisfactory; shipment of goods by air is so small as to be entirely negligible.

Charges for Service—Another element of importance is the charge for the service rendered. The facilities available being large, competition has kept charges low and the ability of each transportation agency to serve some particular field at a less cost than can other agencies has had the same effect. There is no better indication of this than the small number of complaints of passengers and shippers made to the Interstate Commerce Commission and to state public utility commissions. An examination of these clearly points to the fact that today both shippers and passengers are reasonably satisfied with the rates which are charged.

Detailed study fails to support the claim that there is a national transportation problem.

Some necessary changes

3. Many matters of secondary importance however, should have the attention of legislation in the public interest.

Among desirable or necessary changes is the enactment of new regulatory measures in the public interest, and the possibility of *repealing* certain regulatory measures which are no longer in the public interest.

There also may be other special questions, one of which at the present time is the financial condition of many of our individual railways. This would be of public concern if from it there should result inadequate transportation service. Recently also there has been proposed and strenuously urged, a new species of regulation under the title of coordination, which has been very poorly defined by the various advocates. Other similar matters have been presented from time to time, as subjects for regulation.

(The second article, next week, will consider transport regulation.)

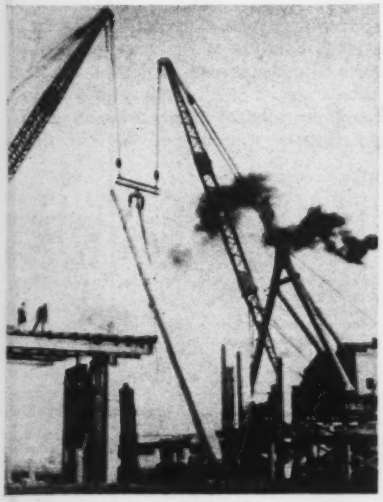
Ingenious Handling of Long, Heavy Piles

By H. P. Treadway
President, Kansas City Bridge Co., Kansas City, Mo.

THE EAST APPROACH to the main spans of the new highway toll bridge crossing the Missouri River at South Omaha, Neb., consists of 1,050 lin.-ft. of concrete pile trestle. There are 31 bents of four piles each, the piles being 24 in. square, 75 ft. long and weighing 23 tons each.

This trestle traverses a Missouri River mud bottom, which was partly under water. The piles were so long and heavy that a single pile driver rig adequate to handle the load was not considered practicable, and the driving was accomplished by the traveler derrick previously used for the erection of the steel trusses (*ENR*, May 23, 1935, p. 727) with the aid of another traveler derrick operating on falsework at a lower level.

PILE WEIGHING 23 tons lifted to vertical and spotted for driving by riding its pointed end on a car truck.



The piles were cast on the completed portion of the bridge and transported over it on push cars. By the use of an equalizer, both derricks lifted a pile from the cars and lowered it to the ground where the pointed end of the pile was placed on a car truck. The lifting cables were arranged so that as the pile was raised toward the vertical the equalizer allowed the lower end to remain on the car and move to its proper position. As the pile approached the vertical position, the middle cable assumed the entire load, permitting the removal of the other two cables. The pile was then placed in exact position and jetted down as far as possible with two water jets of 400 gal. per minute each at 150-lb. pressure. The driving to final position was done with a steam hammer equipped with a follower made to accommodate the reinforcing rods that protruded from the upper end of the pile.

The completion of this rather difficult type of structure was accomplished by the above procedure in a reasonable length of time and without the use of expensive special plant.

Concrete Tunnel Lining Pumped Down Drilled Holes

Work on small-bore sewer tunnels in Minneapolis, carried out by three pumping units on surface fed by truck mixers, averages 60 ft. of lining per 5-hr. shift

By Emory D. Roberts
Professor of Civil Engineering
Marquette University
Milwaukee, Wisc.

PUMPING of materials is a prominent feature in the construction of the Minneapolis interceptor sewer tunnel system. First, the sand-rock muck from tunnel driving, pulverized by light blasting, was mixed with water and pumped to the portal or top of shafts, and now the concrete for lining the small bores is being pumped into the forms from surface-level pumping plants located at intermittent well-drill holes along the sewer line. Both processes are innovations in small-bore tunneling, though concrete has been pumped into larger tunnels at Boulder Dam, on the Colorado River aqueduct and at Baltimore, while the rock pumping was developed concurrently with that on the larger main interceptor, in St. Paul.

The Minneapolis tunnels, aggregating 16 miles in length, are part of a large sewage disposal program being conducted jointly by the Twin Cities to end pollution of the Mississippi River. The program involves local interceptor sewers in both cities, a joint main interceptor and a disposal plant, both located in St. Paul. An outline of the complete plan, and a description of the sand-rock pumping process appeared in *ENR*, Nov. 7, 1935, p. 627. The project is being financed through PWA.

Concrete lining work is being carried on simultaneously at three separate points. Each plant unit consists of a Pumpcrete machine, charged by an elevator bucket, 60 ft. of invert side forms, 60 ft. of sidewall and arch forms, and a 7-in. pipe line leading from the pumping plant through a well-drill hole to the forms. Work is carried on in two 5-hr. shifts daily. The first shift strips, moves and resets the forms; the second shift places 60 ft. of invert and 60 ft. of sidewall and arch concrete in separate sections. Minneapolis has long conducted its construction work by the day labor system, and all of the city's share of the intercepting sewer tunnels is being built by the sewer department, which submitted a low bid to PWA in competition with contractors. Department officials report the work is costing less than bid prices.

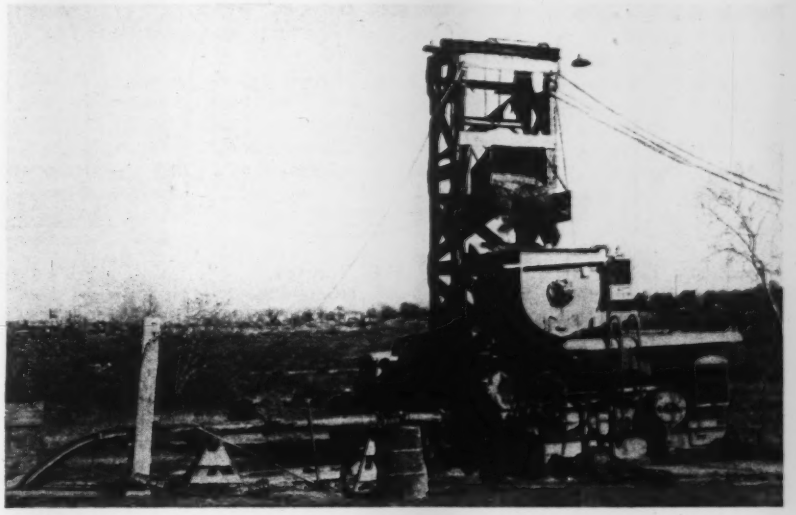
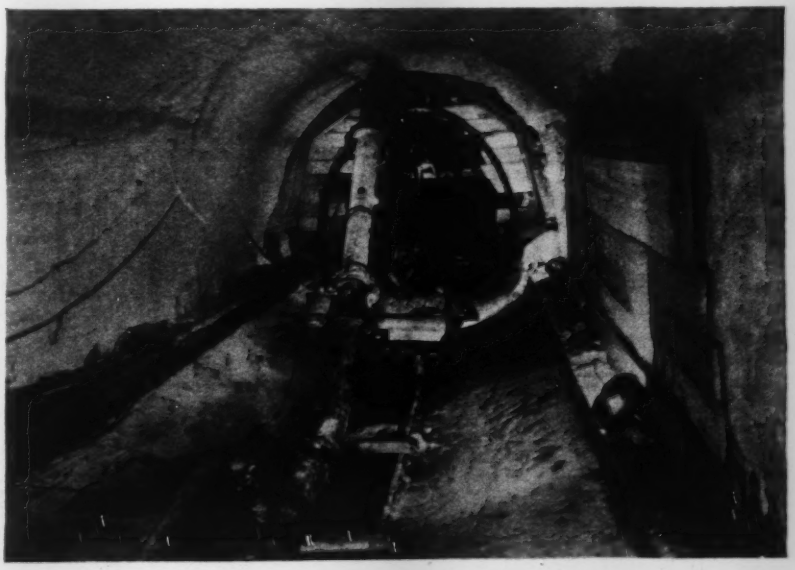


FIG. 1—THE SURFACE PLANT for lining small sewer tunnels in Minneapolis consists of a pumping unit charged by a skip hoist.

Several systems considered

Before selecting the method to be used in placing the concrete lining, the sewer department made a careful study of equipment available and systems in use. There are four sizes of tunnel involved; 3½x6 ft., 5½x6 ft., 8½x8½ ft., and 9½x9½ ft. Naturally, those in charge wanted to select a plant applicable to all four sizes with a minimum of change from one section to another. The plant study revealed that the concrete pumping system had the advantage over all other mechanical placement schemes in that it could handle the smallest of the four sizes of tunnel as well as the other three. Any other plan of placement would have necessitated more expensive hand placing on the smallest section in exceedingly cramped working quarters. As all of the tunnel sections were readily accessible through well-drill holes from the surface, 60 to 85 ft. deep, pipe delivery of concrete to the forms had a distinct advantage over haulage from the bottom of shafts. Furthermore, the pumping method had an advantage over other systems of pipe delivery because of ability to transport concrete a

FIG. 2—THE UNDERGROUND PLANT is a pipeline extending into the top of forms. Compressed air connection for giving the concrete a final kick by a slug of air can be seen in lower center.



greater distance from bottom of well-drill holes, thereby reducing the number of holes required, resulting in a cost saving of $5,000 to $7,000.

The concrete lining plant as finally developed consists of three pumping units at the surface fed by 1½ yd. transit mixers, which are charged at the city's central batching plant, involving a maximum haul of 5 miles. The tunnel line is tapped by well-drill holes spaced a maximum of 1,600 ft. apart. As the scheme of operations provides for pumping of concrete, in both directions from the bottom of a well-drill hole up to a distance of 800 ft., half the time lining progress is towards the hole and the other half is away from the hole.

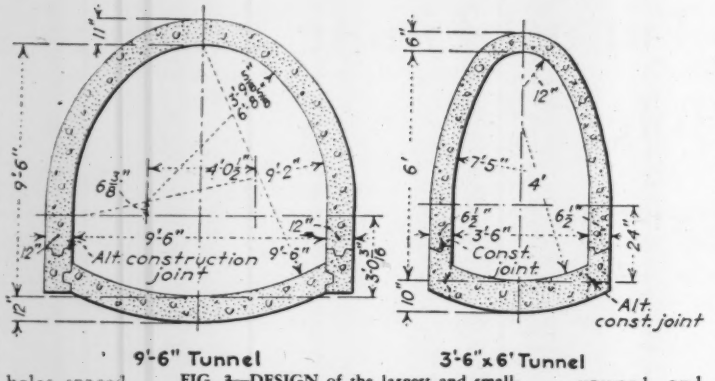


FIG. 3—DESIGN of the largest and smallest of the four tunnel sections. Pumping was the only satisfactory means for mechanical placing of lining in the small section.

Operation of system

A weighing batcher, receiving sand and gravel by derrick charging from stock piles and cement by belt conveyor from a warehouse, charges the transit mixers at the central batching yard. A standard batch is nine sacks of cement, 2,268 lb. of sand and 3,276 lb. of 1½-in. gravel. From tanks on the truck mixers 54 gal. of water (6 gal. per sack of cement) is added to the batch, which is mixed en route to the tunnels. The concrete, of 2 to 3 in. slump, and containing 5.4 sacks of cement per cu.yd., shows 28-day tests ranging from 3,746 to 6,648 lb. per sq.in.

Part of the fleet of truck mixers is city-owned, the rest are rented from contractors, and the sewer department pays the city rent for its mixers at the same rate paid to the contractors. At the job the mixers dump into a ¾-yd. tower hoist bucket, which elevates the concrete to a remixing hopper feeding the pump.

Leading from the pump is a 7-in. discharge line, the first sections of which are horizontal with toggle connection joints. The vertical pipeline through the well-drill hole is welded in one piece 60 to 85 ft. long. At the bottom of this vertical length is a series of quarter and one-eighth bends forming a vertical double reverse curve, which retards the flow of concrete sufficiently to keep the vertical pipe full at all times. All of the pipe within the tunnel is in 10-ft. lengths with toggle connections. A tap at the bottom of the vertical pipe admits air for cleaning the horizontal sections within the tunnel in case of emergency.

The curved invert section, with a short height of lower sidewall, is poured ahead of the arch. No forms are used except those required for the wall footings as the stiffness of the dry mix allows screeding and troweling of the invert to proper curvature. Concrete for the invert is discharged directly into place from the supply line, which is temporarily supported on horses over the section being poured.

After the invert is in place, the remainder of the tunnel section is poured in one piece, with the supply line always discharging at top of crown. The piping arrangement varies with the direction of lining progress. When the progress is toward the well hole, the pipeline rises through two 45-deg. bends and a connecting tangent to the top of forms in a direct line (Fig. 2). When progress is away from the source of supply, the pipe passes through the bottom of the form and then curves upward and backward into the top of forms in the reverse direction (Fig. 4). In both cases final discharge is through a 60-ft. length of welded pipe that is withdrawn from the forms as the crown fills up by taking out or adding 10-ft. lengths of the supply line on the floor. The top horizontal line and connecting curves are all one assembly supported on a traveling carriage. The discharge end of the pipeline is kept buried in fresh concrete.

An airline is tapped into the concrete line at the bottom of the riser leading to the form. The admission of a slug of air at 110 lb. pressure at regular intervals, controlled by a quick acting hand valve, aids in packing this stiff concrete into the crown and forces the concrete into all of the overbreak sections. The arch form is vibrated from the outside with two air hammers applied at point of concrete placement.

The arch forms are collapsible steel sections 60-ft. long, carried on travelers, and set and stripped by means of a group of jacks. An air hoist on the form traveler provides the power for moving the section ahead, and is used also for moving the discharge pipe assembly carriage. Panel openings in the sidewalls of the arch forms, staggered at 10-ft. intervals on either side, provide means for observing the packing of the concrete and its slope in the sidewalls.

At the start of a concreting operation, a batch of grout is pumped through

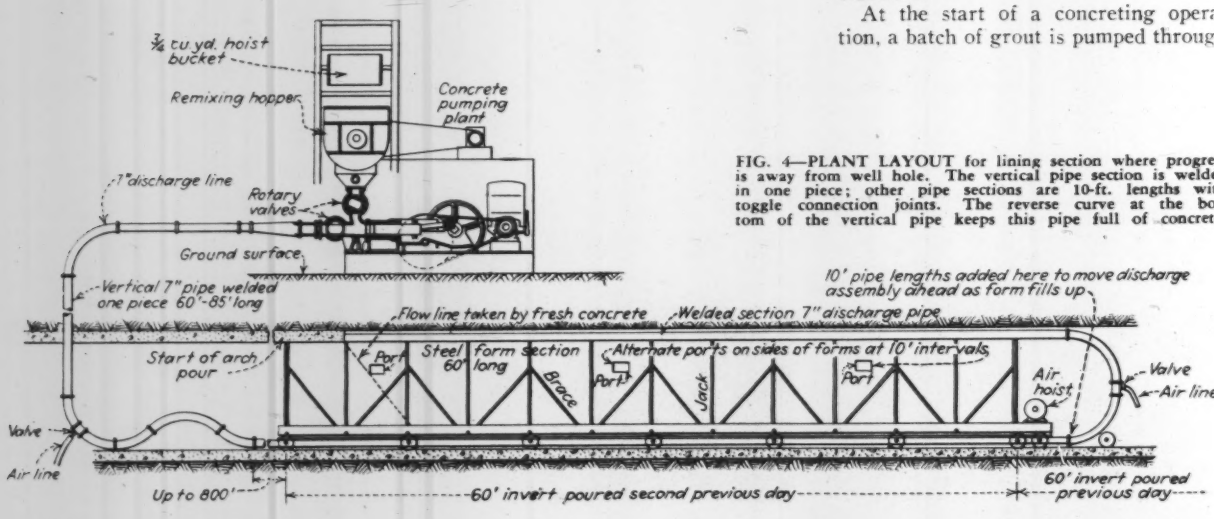

¾ cu.yd. hoist bucket
Remixing hopper
Concrete pumping plant
7" discharge line
Rotary valves
Ground surface
Vertical 7" pipe welded one piece 60'-85' long
10' pipe lengths added here to move discharge assembly ahead as form fills up
Flow line taken by fresh concrete
Welded section 7" discharge pipe
Start of arch pour
Steel form section 60' long
Brace
Alternate ports on sides of forms at 10' intervals
Jack
Air hoist
Valve
Air line
Up to 800'
60' invert poured second previous day
60' invert poured previous day

FIG. 4—PLANT LAYOUT for lining section where progress is away from well hole. The vertical pipe section is welded in one piece; other pipe sections are 10-ft. lengths with toggle connection joints. The reverse curve at the bottom of the vertical pipe keeps this pipe full of concrete.

the line headed by a special tool, known as a "go-devil" made up of two parallel disks faced with rubber and connected by a coupling. It keeps the concrete intact at the start of the operation. When the last concrete has passed through the pump, the section of pipe nearest the pump is removed and the machine is washed out with water. The "go-devil" is inserted against the concrete in the undisturbed line, a section of fire hose is inserted between this line and the pump, and water is forced into the line pushing the "go-devil" ahead of it. This clears the line of concrete and also washes out the pipe. By tapping the line with a light hammer near the discharge end, the approach of the "go-devil" is noted and the pumping is stopped at the proper time to divert the discharge of water.

Full size model tests

The writer conducted experiments on a full size tunnel, constructed above ground, to observe the characteristics of pumping concrete into tunnel forms. The model was built of steel arch forms on the inside and housed over with timbers and planking designed to simulate tunnel timbering and overbreak. Peep holes provided a means for noting the action of the concrete as it was forced into the form by the pump. After removal of the forms it was noted that concrete had been forced into every angle and that the arch was smooth, though in the model tests no vibration was used.

Direction

The intercepting sewer tunnel work is being carried on under the direction of Fred Paul, city engineer, Robert Huston, sewer engineer, and W. L. McMullen, construction superintendent.

The writer is consulting engineer for the Chain Belt Co., which developed the pumping equipment.

Excessive Bridge-Deck Maintenance

By James L. Davis
East Orange, N. J.

EXAMPLES of the collapse of structures from overloading are so infrequently found that the accompanying pictures of a small highway bridge, taken some years ago when the writer was assistant engineer of bridges of the Vermont highway department, may be of interest in showing the behavior of structural steel members in total failure and in serving as a warning in bridge maintenance. The bridge, was about 42 ft. long and 16 ft. wide.

The upper of the two views, looking southeast, shows the collapsed west truss, which went down without the total fracture of any of its members. The lower view, of the northeast corner, shows the probable initial failure of a member—the break in the bottom chord at its connection to the end shoe, visible under the crumpled inclined end post of the east truss. The failure at the southwest corner was similar to that at the northeast corner except that the bottom chord was not broken.

The break in the bottom chord occurred at a rivethole in one of the chord angles. The appearance of the metal indicated a possible incipient fracture caused by punching the hole, but a coating of rust prevented a sure determination.

Too much floor fill

The bridge floor consisted of concrete arches between the longitudinal I-beam stringers, held against lateral thrust by tie rods, a common type of construction in such bridges. On this concrete floor a layer of gravel was spread; the designed thickness of this layer is unknown but would be a few inches at most. The adjacent road surface also was of gravel. As the bridge had been in use for a considerable number of years, the usual road maintenance had added several layers of gravel to the bridge as well as the road, with the result that, according to one local resident's estimate the maximum thickness of the gravel on the bridge reached 18 in., while a town official having some responsibility for the maintenance reported the gravel equivalent to a uniform 12-in. thickness over the entire floor.

Assuming the gravel surfacing 8 in. thicker than the design requirement, the effective excess load on the structure was nearly 17 tons. The symmetry in the crumpling of the four inclined end posts is an indication of failure due to the uniformly applied excess load. It indicates also what was the weakest link in the design of the bridge. The end posts of both trusses must have long been "just ready to go" under the weight of the gravel.

OVERLOADING by repeated additions of gravel to the roadway caused the bridge collapse illustrated in these two views.

Frost Takes Toll of Road Transport—II

Subzero blizzards that swept the central and plains states wrought heavy damage to lighter type roads through frost action and snow-removal operations

UNPRECEDENTED as was the southern extension of last winter's frost zone and the consequent damage to southern roads it was in the central and plains states that frost and snow grasped road transport with destructive hands. It is from these states, therefore, that comes the real story of the battle of highways with winter. As in the previous article (*ENR*, June 21, 1936) the account is based on observations by the editors, accounts by local correspondents and statements of state highway officials.

Northern Mississippi valley states

States of the northern Mississippi valley experienced a violent winter; frost was continuous for weeks and blizzards occurred one after another as told in *Engineering News-Record*, Feb. 27, 1936. Winter damages to roads, therefore, represent injuries wrought by snow removal as well as by deep freezing. This is pointed out in the statement of H. G. Coons, chief engineer, Michigan highway department:

During the past winter trunk line highways have been subjected to extremely severe weather conditions caused by an excessive amount of snow, an unusual amount of ice and long periods during which low temperatures prevailed. It will cost about $150,000 more than usual to put the roads into condition for summer travel.

The excessive snow necessitated a great amount of snow plowing and the plows have damaged many of the highway appurtenances such as guard rails, culvert walls, signs and route markers. It will be necessary to replace and repair these structures. In many instances heavy snow drifts formed and during the time that one way traffic operated over them, vehicles were forced off the traveled portion of the roadway doing extensive damage to the shoulders. In cases where the shoulders were sod, the sod will have to be replaced; where there are gravel shoulders, they will have to be rebuilt and resurfaced.

Severe ice conditions called for continuous sanding and the removal of the ice and sand by scraper blades. Continued action of these blades, particularly on concrete pavement, has removed many of the old patches; it will be necessary to do extensive patching this year, not only to replace the patches that were removed by the action of the scraper, but also to cover those that were caused by freezing and thawing. There are sections of road, such as US 16 between Lansing and Detroit, where it will probably cost in the neighborhood of $100 per mile to replace the patches which were removed during the past winter by the frost and by scraper action.

Long periods of low temperature caused the frost to penetrate the roadbed to great depths and frost heaves have caused whole sections of pavement to push up; it has been necessary to remove entire sections so forced out of position. Frost heaves have been so pronounced that it has been necessary to place temporary patches on the surface of the road to create a gentle rise and fall instead of a sharp bump at the places where this condition occurred. There are points on US 12 where entire blocks of pavement have risen up on one end. It has been necessary to remove them and then as weather conditions moderated to construct new concrete patches.

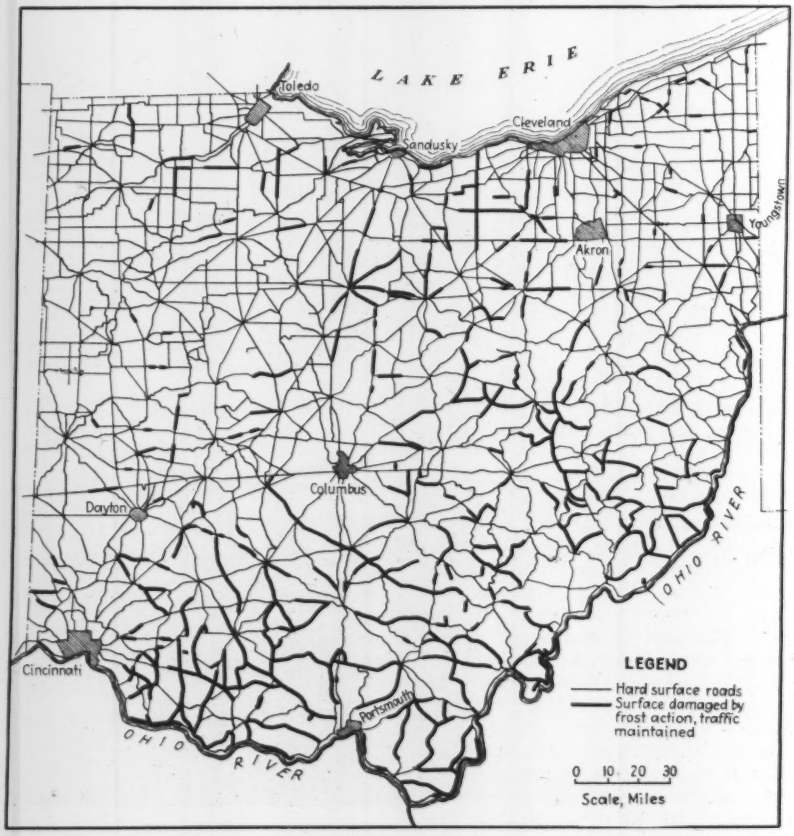
Each year we have the usual problem of placing tar on new cracks that form in the pavements, patching thin spots on gravel roads, painting and repairing signs and guard rail, repairing ditches and drainage structures which have been damaged by the excessive spring water. This year gravel roads suffered severely from the annual spring break-up because the base was frozen so hard.

Swinging west along the northern states of this group, Wisconsin and Minnesota report heavy winter damages. Curiously enough the Dakotas indicate no concern over conditions, stating that they are meeting usual winter damages with ordinary routine maintenance. As will be remembered snow and blizzard colds hit Wisconsin hard (*ENR*, Feb. 27, 1936) in February as reported by W. Hoenig, state maintenance engineer. Reporting again on winter damages to roads, Mr. Hoenig says:

From all indications, the past winter has been one of the hardest on highways that we have had for some time, and due to the extreme cold winter and storms, considerably more damage was done and will be done to our roads than in a normal winter. In the northern part of the state the spring break-up is still going on and we are, therefore, not in a position to determine with any reasonable accuracy just what the increase of costs of repairs will be over a normal year. This can only be done after the spring break-up is over and our roads are settled back and have been repaired.

In the southern half of the state, where the frost is practically out of the ground, there is every indication on our hard-surfaced roads as well as on our lighter surfaced highways that the damage due to frost action is from 30 to 40 per cent greater than it would be in a normal year. Due to the extreme cold, the frost penetrated much deeper, and many concrete pavements are badly cracked and broken.

STATE ROADS in Ohio that were surface damaged by frost and will require extra repair. Note the curious concentration of damage in the East and South.



and the same is true of bituminous surfaces and light-surfaced gravel and crushed-stone highways. Due to the depth of the frost, the damage is also more severe.

Another reason for the damage this spring was the severe storm that we had for a period of six weeks, when we had snow drifts as high as 20 ft. on our highways and heavy equipment had to be out 24 hours in the day to keep traffic going, and on many of our highways the continuous operating of this equipment did considerable damage.

An analysis of repair costs and a classification of damages that are remarkably complete comes from Minnesota, one of the states hardest hit by the snow blizzard of February (*EN-R* Feb. 27, 1936). This accounting by chief engineer J. T. Ellison has particular interest. It follows:

The severe storms and sustained cold weather during the winter of 1935 and 1936 have subjected the highways of Minnesota to the most serious impairment and damage of any season since the trunk highway system was developed.

A review of the roads indicates that it was necessary to expend about $350,000 more to remove snow during this past winter than the average past two years' expenditures, and over $1,000,000 more than in the winter of 1933-1934. In addition to the heavy snow, the cold weather forced frost to penetrate from 6 to 9 ft., and because of this great depth of frozen ground the spring thaw resulted in both surface and base damage. This may be expressed more specifically by the fact that in the spring of 1935 there were less than 100 mi. of impassable roads in the trunk highway system, while in the spring of 1936 there were somewhat in excess of 550 mi., or a ratio somewhat above six to one.

In addition to the damage to the traveled portion of the highways, shoulders and backslopes also received more damage than at any previous time, due largely to the fact that although the highways were kept open to traffic, most of the snow which was plowed from the surface completely blocked normal drainage along the ditches; in fact, snow removed from the surface was piled so deeply along the shoulders and ditches that as thawing began the resulting water completely saturated the entire road width. This resulted in a great amount of shoulder wash and sloughing of the backslopes.

It will be necessary to expend about $100 a mile to recondition shoulders and backslopes. This is particularly true in the southern part of the state where silts and silt-loam soils predominate. It is estimated that somewhat over 1,000 mi. of road will need special maintenance because of this erosion; this will result in an expenditure of about $100,000 for shoulder repair and ditch cleaning, if the highways are to be brought back to the condition of last fall.

At the present time there are about 5,000 mi. of gravel surfaces and somewhat above 3,000 mi. of bituminous surfaces in the state trunk highway system. The opinions of the district maintenance engineers, who are in charge of maintaining these highways, indicate that from $150 to $300 per mile must be spent on the gravel surfaces, merely to replace the gravel lost by penetration into bases weakened by spring thaws. It is probable that about 2,500 mi. of gravel surfaces will require an expenditure of $300 per mile and the remaining 2,500 mi. will require an expenditure of $150 per mile for replacing gravel. Should this graveling be undertaken to bring back the surfaces to the condition as of last fall, an expenditure of over $1,000,000 will be necessary.

A similar condition of damage exists over the light bituminous surfaces. Completed estimates submitted by our district maintenance engineers show that an expenditure of over $1,500,000 is necessary for retreatment and again this expenditure will only bring these bituminous surfaces to the condition existing prior to the past winter.

In addition to repairing the roadways and road surfaces, there has been a considerable amount of damage because of flood conditions caused by the exceptional amount of water accumulated from the high precipitation of the past season. While the estimates for repairing damages from floods are not yet available, it appears that the amount of money required will be about $200,000. This sum must be expended to replace bridges weakened by excess flood run-off and to replace bridge approaches, some of which have been almost completely swept away.

Adding these figures together, it is evident that considerably more than $3,500,000 will be necessary not to better any of the structures or highway surfaces, but merely to put them in the condition in which they entered the past winter. These estimates are thought to be conservative and do not include damages that may have occurred to the concrete surfaces. At the present time

MOST WINTER DAMAGE took place on secondary roads of light construction; this is a bituminous-treated county road.

FROST HEAVES, more common than frost boils, humped up the surfaces of all types of roads including those with rigid pavements.

no estimates are available on this item and it is very probable that the results of the damage to the rigid type of surfaces, as well as some of the intermediate types of surfaces, will not be disclosed for a period of several years.

It is, of course, impossible to estimate the ultimate total damage resulting from snow, frost and flood, but considering Minnesota's construction investment in the trunk highway system of about $225,000,000, and allowing only 5 per cent damage to this investment, we find that well over $10,000,000 may be charged against such conditions as existed during this past season, and it is probable that this estimate is conservative.

In the zone of states south of Lake Michigan and Lake Erie, winter damages are reported large in Ohio and Indiana and not exceptionally serious in Illinois and Iowa. Writing of conditions in the last named state Fred R. White, chief engineer of the road commission, says:

Although the frost this past winter went much deeper than in ordinary winters and there was consequently much more pronounced heaving of our roads with resultant uneven riding surface, I doubt very much whether in the final analysis the actual dollars of damage or cost of repairs are materially different from other winters. Now that the frost is mostly out of the ground, our pavements are rapidly settling back into shape, the bumps have disappeared and very little apparent permanent damage has been done in excess of a normal year's damage. When the frost started to go out of the ground, mud holes developed on our gravel roads here and there. This happens almost every spring. Possibly it was a little more severe this spring than usual. Certain it is that break-ups on our gravel roads this spring were much less severe than we had anticipated.

Just east in Illinois, the chief engineer of highways, Ernst Lieberman, is even more conservative in appraising winter damage to roads. He states that "it is true that some extra damage was done, but no roads were blockaded nor has traffic been seriously inconvenienced. There would have been some breakage and disintegration even though the winter season had been normal. There are a number of places on old roads built more than twelve years ago that are in need of reconstruction, the conditions being due to design, age, traffic, subgrade and other similar causes."

Real damage costs and mileages, as indicated by the accompanying map, were recorded in Ohio.

Estimating damage costs, chief engineer G. M. Anderson states: "We estimate it will cost over $3,000,000 to repair the damages caused by frost which is at present noticeable, and that the amount of damage done to some types of roads that cannot at the present time be definitely determined, will run into a staggering figure. In addition to this we had a $1,000,000 flood damage along the Ohio River."

Drawing definite lessons from the winter's experience, C. W. McClain, engineer of maintenance, says of Indiana:

We have had the most severe winter in the history of our weather bureau. From the Ohio River to Lake Michigan, unusual conditions prevailed and even as far south as the Ohio we had 30 in. of frost, an unprecedented condition. Unfortunately, when this frost went out from U.S. 40 south, it left quite suddenly. This contributed to much more break-up than from U.S. 40 north where the frost went out more gradually. The cost of this break-up is rather difficult to estimate. Certainly one-half million dollars would be a conservative estimate to put our roads in the condition in which they were when they entered this severe winter.

The type of maintenance will have to be changed on some of our roads which have broken up most severely. We find it will be uneconomical to surface-treat oil mats which up to now carried traffic without breaking. Traffic conditions will not permit a drag surface any longer. This forces us to the use of road oils to tie down these surfaces rather than the more expensive materials.

Mountain and Pacific Coast states suffer only slight damage

Perhaps the most favorable report on frost damages to roads in all the country comes from the Rocky Mountain and Pacific coast states. Commenting on conditions N. A. Bowers, Pacific coast editor *Engineering News-Record*, states:

Oregon, Washington, California, the states with which I am most familiar, have most of their areas within range of ocean influence to such an extent that extremely low temperatures rarely obtain and never persist. The exception, of course, is in the high mountain passes where west-east roads cross the passes at elevations ranging up to 10,000 or 11,000 ft.

I have seen quite a few bad frost boils at high elevations where asphalt pavement had an insufficient depth of ballast beneath it. Other than these typical frost boils my impression is that our risk of frost on the Pacific Coast is not a very serious hazard and is taken care of quite adequately by the construction standards which now obtain on all state highway work.

Beginning with adequate ditches on the sides, the subgrade is given a crown sufficient to insure drainage. On this the thickness of ballast (usually gravel) is varied to suit weather conditions. As much as a 2-ft. depth of gravel ballast is used in bad locations. Constructed in this way and under our relatively mild climatic conditions, our roads do not face a very serious frost risk—at least this is the impression I get from such contact as I have with our highway-construction engineers.

Experience of the Oregon Highway Commission in the construction and maintenance of highway pavements has led to the adoption of a standard requirement that gravel ballast be used under all road surfaces. The ballast gives a uniform load distribution and prevents the bad results of capillary attraction that otherwise would bring moisture up against the under face of the surfacing. The thickness of ballast specified varies widely with conditions; a minimum of 6 in. is called for on city streets where excavation and waste disposal costs are heavy, the average requirement is about 9 in., and the maximum from 12 to 18 in. is called for in regions where frost conditions are bad. In cold, wet mountain passes gravel ballast as much as 24 in. thick has been used as a protection against frost boils.

By giving adequate crown to the subgrade good drainage is provided through gravel ballast even on impervious material such as clay. Because of the large and widely distributed gravel deposits throughout most of the state it is customary to figure the cost of gravel as about 50c. per cu.yd., loose measure, in place. A 9-in. cushion of gravel ballast extending over a 40-ft. width of the subgrade (including shoulders) in the ordinary highway paving job increases the cost of the finished road by about $3,500 per mile. Thus, for a nominal increase in the capital investment the pavement has considerably greater insurance against failure and decidedly less maintenance cost, in the opinion of R. H. Baldock, of Salem, Ore., state highway engineer.

Referring to this construction in the past winter's experience Mr. Baldock reports that "light constructed roads suffered more damage than usual while the more modern construction evidenced but little distress." Reporting for Washington, L. V. Murrow, director of highways, says:

The damage sustained by highways in this state by reason of abnormal weather conditions was not particularly excessive. Measured in dollars and cents we were forced to expend a total of $103,300 for repair of extraordinary frost damage. This damage was principally to oiled and bituminous types of road surfaces, of which types we have 2,500 miles throughout the state. This would be an average of about $40 per mile or just 10 per cent added to the normal cost of maintenance.

In this state we normally expect each year a certain amount of frost damage in the eastern part, but west of the Cascade range we seldom get frosts of such severity as to cause any general break-up. This year the frost damage on the west side amounted, in costs to repair, to 35 per cent of the total for the entire state.

Generally speaking I would say that our frost damage throughout the winter of 1935-1936 was 75 per cent greater than in any year of which we have record. In explanation of my statement first above and to the effect that "damage was not particularly excessive," will say that this could have been much greater except for lessons we have learned, and are still learning, with reference to the subgrade structure and drainage of asphaltic-surfaced roads.

California had little frost damage and Nevada reports that $7,500 will cover all expenses. K. C. Wright, chief engineer, reports from Utah that there is no doubt that the past winter has played havoc with oil-mulch and bitulithic mix roads, especially those with inadequately drained subgrade. Comparing maintenance costs on 5,126 miles of state road, "if the first three months of 1935 equals 100, the corresponding three months of 1936 equals 131." Colorado reports no greater trouble this year than formerly, while Wyoming reports $100,000 and Montana $500,000 damage.

Open Mesh Steel Deck For Flood-Damaged Bridge

By H. S. Ayres
Engineer in Charge, Division of Bridges
Department of Public Works
Pittsburgh, Pa.

WHEN the rivers at Pittsburgh rose to a crest nearly eight feet higher than any previously recorded flood the wood floor of the Second Avenue Bridge over Nine Mile Run floated off its steel supports and disappeared down the Monongahela River. Speed of repair was highly essential and it was also desirable that the new floor should be better and relatively not much heavier than the floor that was lost. The solution was the use of an open mesh steel deck believed to be the first installation of the kind between the Alleghany and the Rocky Mountains.

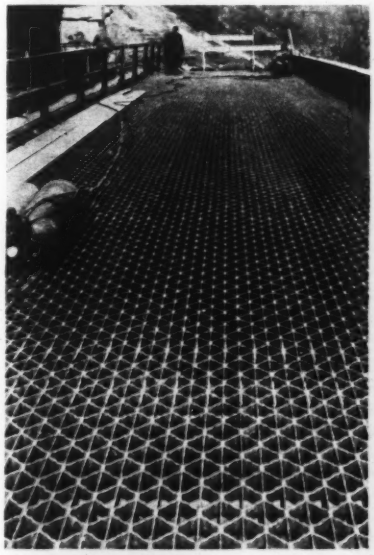
The Second Ave. Bridge provides the only vehicular access to a small community lying to the east of the Nine Mile Run Valley. From 1886 to 1907 trolley cars passed over it en route to Braddock but when the route of the trolley line was changed the rails were removed and the wood floor reconstructed in 1908. It is a through plate girder span 78 ft. long and 24 ft. wide with plate girder floorbeams. The steel members and stone abutments have withstood the elements for 50 years, are still in good condition, and were undamaged by the flood waters.

Because the bridge is not easily accessible for cleaning after a snow fall, a self cleaning deck was desirable, as was a non-float, non-skid light weight floor that would safely carry H-10 loading. These specifications were met by the open mesh decking and a rush order was immediately placed for enough units to cover the 16x80 ft. roadway. Made up of $2\frac{1}{2}$x$\frac{3}{8}$ in. straight longitudinal bars on edge spaced $2\frac{1}{2}$ in. c. to c. with crimped reticuline bars $1\frac{1}{2}$x$\frac{3}{8}$ in. forming a horizontal web system with the top edge flush with the straight bars, this steel deck weighs only $15\frac{1}{4}$ lb. per square foot. It was delivered by truck from the plant of the Irving Iron Works Co. in Long Island City, New York, within four days after receipt of the order. Also ordered and delivered at the same time was grating for the $3\frac{1}{2}$-ft. sidewalk. This grating consists of $\frac{3}{4}$x$\frac{3}{8}$ in. straight bars spaced $\frac{7}{8}$ in. c. to c. and $\frac{3}{4}$x$\frac{1}{8}$ in. reticuline bars, and weighs about 10 lb. per square foot.

Immediately after the decking was ordered an emergency contract was placed with the Fort Pitt Bridge Works, of Pittsburgh, for the steel supports necessary for the decking. These consisted of three lines of roadway stringers (12 in. 20.7 lb. channels) on top of which were cross joists of 8 in., 13.75 lb. channels spaced on about 18 in. centers. Similar new steel was placed under the sidewalk. By quick action the fabricator had the supporting steel in place before the decking was delivered. All field connections were

Blaw-Knox Photo.

AFTER FLOOD WATERS in this creek carried away the timber floor of this Pittsburgh bridge, the new open mesh steel deck was installed and in use within 8 days.



FLAT, both lengthwise and transversely, the open mesh deck is also structurally continuous from one end of the span to the other. Erection units 25 in. wide and 25 ft. long are spliced by special hand riveters.

FROM BELOW the open mesh steel deck presents an interesting pattern. New stringers and cross joists serve to support the new floor.

welded, including the attaching of the open deck to the supports. The sections of the decking were, however, riveted together by means of hand riveters designed for that purpose.

While this work was going on the back walls of the abutments were reconstructed by city forces, and the bridge was open to traffic eight days after the first order was placed. The contract price for furnishing of the steel supports and other structural members was $2,292, and the total cost of the grating for the roadway and sidewalk delivered to Pittsburgh was $1,951, a total cost of $4,243.

A small unit, but very important to the people it serves, this job was one of the many reconstruction projects necessitated by the March 18 flood, and was carried out by Pittsburgh's department of public works under the general direction of Leslie M. Johnston, director, Henry D. Johnson, Jr., chief engineer, and the writer as engineer in charge of bridges.

"Preferred Numbers" and the Civil Engineer

Strangers to most civil engineers, preferred numbers refer to a geometric series of numbers recommended in standardization of sizes of machines, materials and manufactured products of all kinds

By Robins Fleming
American Bridge Co., New York, N. Y.

THE GREAT MAJORITY of civil engineers, especially those not occupying professor's chairs, have no knowledge of Preferred Numbers. This can be easily verified by the reader. Let him ask his professional acquaintances (as well as himself) what they are. "Never heard of them," will be the almost invariable reply. Considering the attention the subject has received in mechanical, electrical and industrial engineering this is somewhat strange.

"Preferred Numbers are series of numbers selected to be used for standardization purposes in preference to any other numbers. . . . In order to facilitate the standardization of a series of sizes or ratings along logical and rational lines, Preferred Numbers have been selected to have definite relations to one another." (American Standards Association.)

"Stripped of all mystery and mathematical formulas and expressions, preferred numbers are simply groups of certain numbers which should be used in preference to any others whenever a standardization of ratings, dimensions or what not is desired." (R. E. Hellmund, chief engineer, Westinghouse Electric and Manufacturing Company, in *Electrical World*, August 18, 1934). As Mr. Hellmund says elsewhere (*Product Engineering*, September 1932): "Fundamentally, the problem of choosing sizes and ratings resolves itself into that of determining the proper economic balance between a number of factors entering into the cost and utility of the product." In the past, these sizes and ratings have been established by manufacturers, often to meet demands, sometimes at random but seldom on any scientific basis.

A striking exception to the haphazard method is the Brown & Sharpe gage, known as the American wire gage. This gage, which dates back to 1857, has for the basis of its size variation a geometric progression giving each increasing size a diameter greater than the preceding one by a constant percentage $\sqrt[39]{92} = 1.229$. That is, the diameter of each succeeding number can be found by multiplying the preceding number by 1.229. The basic size is No. 36, which is 0.005 in diameter.

Geometrical progressions best

Emphasis should be laid upon the word "preferred." A series of gradations in geometrical progression is preferable to any other. "The fundamental elements of the system called Preferred Numbers lie first in the proposal to arrange standard size series so that each succeeding model in the series shall be larger than the preceding size not by a definite amount but by a fixed percentage," according to F. J. Schlink (*American Machinist*, July 12, 1923).

This is in accordance with psychology. In comparing two objects we usually say that the one is so many times heavier or such a percentage lighter than the other. Seldom do we think of their actual difference in pounds. The fountain pen with which these lines originally were written holds 1/15 oz. of ink. The capacity of another pen holding 50 per cent more ink would mean little if advertised to hold 1/30 oz. more than the first. We intuitively make most of our comparisons of size and capacity not in increments of a definite amount but by a stated percentage.

The American Standards Association has presented for the consideration of industry an American Standard of Preferred Numbers which is given in Table I. Mathematically, the factor by which each figure is multiplied to obtain the next higher figure has been established as follows:

For the 5 series, $\sqrt[5]{10}$, or 1.5849
For the 10 series, $\sqrt[10]{10}$, or 1.2589
For the 20 series, $\sqrt[20]{10}$, or 1.2201
For the 40 series, $\sqrt[40]{10}$, or 1.0592

An 80 series has also been prepared from a mathematical factor of $\sqrt[80]{10} = 1.029$, the steps thus varying by about 3 per cent, but it is recommended that its use should be discouraged.

Historically, a series based on the 10th root of 10 was studied and applied by Colonel Charles Renard, a noted French engineer, in 1879 and published by the French War Ministry in 1886. This was probably the earliest systematic method of fixing increment factors for size standardization.

It is readily seen that the fewer steps the fewer are the sizes required, with a lessened cost to both manufacturer and customer. Savings can be brought out in a number of ways—materials, labor, storage space, catalogs, selling cost, all of which tend to decrease cost of production. For this reason when practicable the 5 series should be used for standardization in preference to the 10 series, the 10 series in preference to the 20 series and the 20 series in preference to the 40 series.

The basic preferred numbers system, being an international system, is based on the use of decimals. But as the use of fractions has become so thoroughly established in the countries using the inch system as the unit of measurement, it was considered advisable by the American committee to devise a fractional system of Preferred Numbers over the range between $\frac{1}{8}$ and 40 inches, where the use of fractions is most customary.

More than a score of articles and papers could be quoted showing the underlying principles and uses of a series of preferred numbers. One such paper to which reference is often made is "Size Standardization by Preferred Numbers" by C. F. Hirshfeld and C. H. Berry, both of the Detroit Edison Company. It was presented at the annual meeting of the American Society of Mechanical Engineers, New York, December 1922. As the authors say, they "have attempted to picture the present status of the preferred-number idea and to do it in such a way as to point out its advantages and also its complications and dangers." The discussions following the paper were hardly less interesting than the paper itself. They have been reprinted together as a monograph of 60 pages.

What about civil enginering uses?

The possible applications of Preferred Numbers to the standardization of mechanical and electrical apparatus, automotive parts, hardware, furniture and the like are innumerable. It is a pertinent question to ask if and when they can be

applied in the field of civil engineering. A writer (Edward G. Fiegehan) in *The Engineer* (London), issues of June 5 and December 4, 1925, presents an article, "The Standardization of Crane Essentials." The increment in load capacity between stock sizes of cranes, he thinks, has already been fixed by common consent. A typical range of sizes for traveling cranes, he says, would appear to be 1, 1½, 2, 3, 5, 7, 10, 15, 20, 25, 30, 50, 75, 100 tons. The series has been reconstructed by Prof. E. R. Hedrick (*Mechanical Engineering*, August 1926) in accordance with the formula, $t = ar^n$ in which t = tons capacity, $a = 1$, $r = \sqrt[5]{10}$ and n = corrected size number. Common lifting capacities of American electric traveling cranes are 5, 10, 15, 20, 25, 30, 40, 50, 60 tons respectively. It is seen at once that the increment of increase is not a constant geometric ratio.

On semi-logarithmic paper a straight line which is not parallel to either axis is the plot of a geometrical series. That is, such a line represents a succession of terms each of which bears a constant ratio to the preceding one. Conversely, if the line representing these ratios be not straight from the first term to the last the ratio is not constant.

I-beam sizes

Sidney Wilmot, in an article, "The Possibilities of Preferred Numbers in Civil Engineering" (*Engineering and Contracting*, February 1925) calls prefered numbers, "ordinary numbers with an extraordinary use." To a vast majority of engineers, he says, they are probably unknown. He deals specifically in his article with steel I-beams. The sizes then in use proved an uneconomical scale. Excluding special and supplementary sections, which were not readily obtained, the basic sizes listed in the ascending order of their section-moduli (the measure of their strength) evidences an interesting relationship. "It is a pertinent question," he writes, "why gradations should not be more uniform or at least more systematic. Is there any sufficient reason why for small sizes the average wastage is three times as much relatively as for the large sizes?" He goes on to say, "The preferred number system answers this question by providing approximately equal variations on a percentage basis." The data in Table II are pertinent. They are taken from the second edition (1876) of the "Pocket Companion," listing the I-beams then rolled by Carnegie Brothers & Co. It will be noted that "resistance" is now usually tabulated as section modulus. Note also the wastage there often would be if the heavy sizes were not obtainable without delay.

More logical variations

That the variation in size and strength of I-beams has become more systematic is seen by reference to the "Pocket Companion" or the Bethlehem "Manual of Steel Construction," both dated 1934. Of equal importance is the fact that the properties of beams of the same weight in the two handbooks are nearly identical. This brings to mind a personal recollection or two. Many years ago the writer made an estimate of a building in which there were a number of unusual sizes and weights of beams. The designer, a man of but little experience, was finally interviewed. "I have three handbooks," he said, "and I picked out the beams nearest the strength required." He did not happen to have the Phoenix or the Jones & Laughlin handbooks or he might have added to his choice. Again, the question was asked a prominent architect why he had not used a certain make of beams in the design of a certain building. "It makes no difference what I use," he replied. "If I design with Carnegie beams a fabricating firm using Bethlehem beams will be sure to take the contract and if I use Bethlehem beams the contract will invariably be placed with a firm using Carnegie beams." This was an annoyance to him as he had to check his architectural plans for clearances as well as examine the substituted beams for strength.

TABLE I—BASIC PREFERRED NUMBERS DECIMAL SERIES (10 to 100)

5-Series (60% Steps)	10 Series (25% Steps)	20-Series (12% Steps)	40-Series (6% Steps)
10	10	10	10
			10.6
		11.2	11.2
			11.8
	12.5	12.5	12.5
			13.2
		14	14
			15
16	16	16	16
			17
		18	18
			19
	20	20	20
			21.2
		22.4	22.4
			23.6
25	25	25	25
			26.5
		28	28
			30
	31.5	31.5	31.5
			33.5
		35.5	35.5
			37.5
40	40	40	40
			42.5
		45	45
			47.5
	50	50	50
			53
		56	56
			60
63	63	63	63
			67
		71	71
			75
	80	80	80
			85
		90	90
			95

Preferred Numbers below 10 are formed by dividing the numbers between 10 and 100 by 10, 100, etc.
Preferred Numbers above 100 are formed by multiplying the numbers between 10 and 100 by 10, 100, etc.
Percentage steps in headings are approximate averages.

TABLE II—CARNEGIE I-BEAMS OF 1876

No. of Order	Description	Depth	Weight Per Foot	Inertia Perpendicular to Axis	Resistance
1	Heavy	15	67	682.0	90.9
2	Light	15	50	528.7	70.5
3	Heavy	12	60	373.7	62.3
4	Light	12	42	267.0	44.5
5	Heavy	10½	35	173.8	33.1
6	Light	10½	31½	154.9	29.5
7	Heavy	10	38	175.5	35.1
8	Light	10	30	149.0	29.8
9	Heavy	9	30	118.7	26.4
10	Light	9	23¾	100.0	22.2
11	Heavy	8	27	84.8	21.2
12	Light	8	22	70.4	17.6
13	Heavy	7	20	49.2	14.1
14	Light	7	18	47.0	13.4
15	Heavy	6	16	29.2	9.7
16	Light	6	13½	24.7	8.2
17	Heavy	5	12	13.8	5.5
18	Light	5	10	11.8	4.7
19	Heavy	4	10	7.0	3.5
20	Light	4	8	6.0	3.0
21	Heavy	3	8	3.2	2.1
22	Light	3	7	2.9	1.95

A practical I-beam series

A paper, "The Rational Design of a Series of Steel Sections," by Fred T. Llewellyn read before the Brooklyn Engineers' Club and published in the *Proceedings*, October 1927, has been reprinted as a monograph. The paper merits high praise. It is the outcome of careful and extended study and is thoroughly scientific throughout. Rolled beams are considered from standpoints other than the theoretical. Academic values are modified to fit into a feasible working series. The practical series evolved, starting with a depth of 12 in. and ending with 24 in., moves with a fairly regular progression of strengths. The average of steps is 10.2 per cent; the maximum step is 14.2 per cent. The depths are 12, 14, 16, 18, 21, 24 inches. These sections, since the paper was written, have been incorporated as a part of the series produced under the name of Carnegie beam sections.

Mr. Llewllyn closes his paper with a paragraph: "Specifically, the principle of geometrical progression was found to be of great practical value. . . . The writer wonders whether civil engineers may not find it can be used with advantage in other fields of design."

Flush Wave Velocities in Sewers

Tests in small diameter sewer pipes, on flat slopes, indicate that effective distance of flush wave is short and dependent upon slope, size of flush and amount of natural flow

By E. W. Lane and O. J. Baldwin
Professor of Hydraulic Engineering and Instructor in Civil Engineering, State University of Iowa, Iowa City, Iowa

THE EFFECTIVENESS of flushing in preventing the formation of deposits in sewers has long been recognized and some experimental data have been published for sewers laid on grades of 0.50 per cent and greater, but experimental data on flushing in small sewers, laid on flat grades, are not generally available. Thus, in order to determine the efficiency and effectiveness of flushing in small sewers, experimental sewers of 6 and 8 in. in diameter were laid on grades of 0.23 per cent and 0.37 per cent, with three flush tanks installed at critical points.

The sewer installation was a temporary one in a flat region where the ground water level was within a few feet of the surface. At the time is was believed that a flat grade flushed frequently to keep the sewers clean, would be more economical than increasing the installation cost by using steeper slopes and handling the increased flow which would result from infiltration if they were placed at lower depths. Flushing, in addition to an occasional manual cleaning, proved to be a satisfactory way of preventing the formation of deposits.

Observing the flush waves

The flush tanks, located at the points indicated in Fig. 1, were constructed by equipping the standard 5-ft. diameter manholes with automatic siphons having a 7½ in. diameter pipe connected to the sewer. Operating automatically, tanks 1 and 3 discharged a flush of 170 gal. in about 26 sec. under a head varying from 31 in. to 17 in. Tank 2 discharged a flush of 125 gal. in about the same time but under smaller heads. Larger flushes were obtained by removing the bell on the siphon and covering the pipe with a small board having a cord attached to it. With the board in place, a maximum flush of 310 gal. could be released from tanks 1 and 3, under heads varying from 48 in. to 23 in. The corresponding maximum flush in tank 2 was about 185 gal. A typical discharge curve for an automatic flush in tank 3 is shown in Fig. 2. The

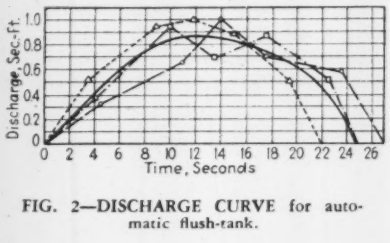


FIG. 2—DISCHARGE CURVE for automatic flush-tank.

discharge curve for an artificial flush would differ slightly in that the maximum discharge rate would occur very soon after the discharge pipe was opened.

Observations on the velocities were made by releasing small floats at the first manhole below the tank the instant the flush wave appeared, and then recording the time of appearance of these floats at successive manholes. It was observed immediately that the floats tended to lag behind the front of the wave by an increasing distance as the wave progressed down the sewer. It was found that the front slope of the wave apparently was moving with a greater velocity than the water due to the piling up of the natural flow, which was moving at a much slower rate, in front of the wave.

Fig. 3 illustrates the apparent increase in velocity. Thus at any instant of time t_o, the flush wave, which is advancing to the right with an average velocity V_f, is at the point T_o. At this same instant, a particle p, of the natural flow is at the point A_o and is advancing to the right with a velocity V_n. At the end of the unit of time, Δt, the flush wave has advanced a distance $V_f \Delta t$, to a point T_1; V_f is the average velocity over the period of time Δt. In this same period of time, the particle of natural flow has moved a distance $V_n \Delta t$ to the position A_1. During this unit of time the natural flow between points T_o and A_o has been piled up in front of the advancing wave as indicated, and has advanced to the front of the wave by an amount Δs. Thus it will be seen that although there has been an apparent increase in the velocity of the wave, the front of the wave at point A_1 has an instanteous velocity equal to that of the natural flow of the sewer, since it has not as yet been accelerated, and that the

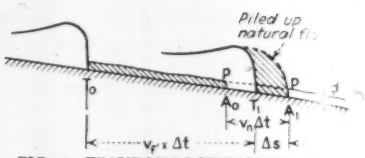


FIG. 3—WAVE-VELOCITY VARIATIONS in the sewer line.

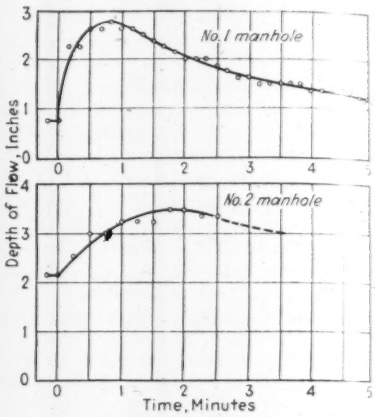


FIG. 4—WAVE CHANGES due to piling up of natural flow.

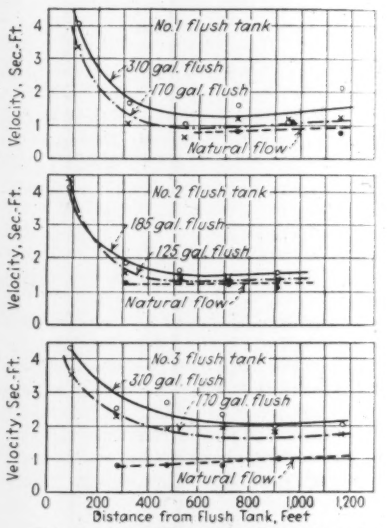


FIG. 5—CHANGES IN VELOCITY with distance.

actual effect has been to decrease the flush wave velocity by an amount which will raise the natural flow above its original elevation and, at the same time, will accelerate the piled up natural flow from a velocity V_n to the instantaneous velocity of the entire wave at the end of the instant of time.

Changes in wave shape

The change in the shape of the flush wave due to the piling up of the natural flow is well illustrated in Fig. 4. Due to very little natural flow between the flush tank and the first manhole, the front of the wave is quite steep after traveling the 244 ft. from the flush tank. With an increased natural flow between the first

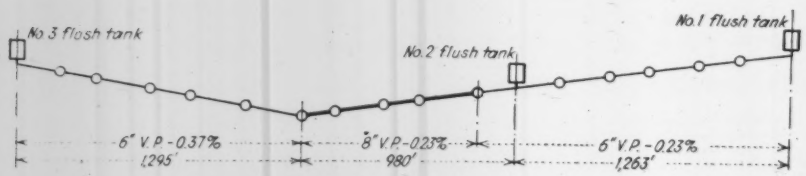


FIG. 1—FLUSH TANK arrangement along sewer line.

and second manholes, the wave shape is changed very markedly in 184 ft.

In Fig. 5 the velocities of the natural flow and of the two sizes of flushes have been plotted against the distance from the flush tanks. The velocities of the flush waves decreased rapidly with an increase in distance from the flush tank, and on the 0.23 per cent grade were so reduced by a travel of 300 to 400 ft. that the effect beyond this distance was negligible. On the 0.37 per cent grade the minimum velocity was about 3 sec. ft. which is about the minimum velocity that will prevent the formation of deposits.

These observations are in fair agreement with those obtained by others in earlier tests on steeper slopes and for larger flush quantities. The results indicate that on flat slopes, the flush is effective for only a short distance below the flush tank and that this distance depends on the slope, the size of the flush, and the amount of natural flow in the sewer at the time of flushing.

E. L. Waterman, Professor of Sanitary Engineering, and Prof. C. J. Posey, Department of Mechanics and Hydraulics offered valuable comments and suggestions on the development of the data.

Welded Girder Cantilever

Three span highway bridge in Tokyo, Japan, built with intermediate pier legs integral with girders, is 440 ft. long and crosses nineteen rail lines

THE NEW EZOZAKA BRIDGE built by the Japanese Government Railways at its Tabata Station in Tokyo furnishes an interesting example of all-welded bridge construction. Of cantilever girder type, it contains three spans of 133, 174 and 133 ft., and is designed with its two intermediate pier legs integral with the girders. The central 174-ft. span contains a suspended portion 114 ft. long. The bridge carries a 23-ft. street and two 6½ ft. sidewalks over four electric railway lines and fifteen railroad tracks.

The government railway department has been utilizing welding since 1931 to repair and reinforce its old girder bridges, and chose welding for this new structure after studies indicated a 17 per cent saving in steel over a comparable riveted design. This saving is itemized in the accompanying tabulation.

	Riveted Tons	Welded Tons	Weight Tons	Decreased Per Cent
Main Girders..	450	370	80	18
Floorbeams....	60	48	12	20
Stringers.....	173	140	33	19
Bracing.....	9	8	1	..
Shoes, etc.....	25	25	0	..
Total.....	717	591	126	17

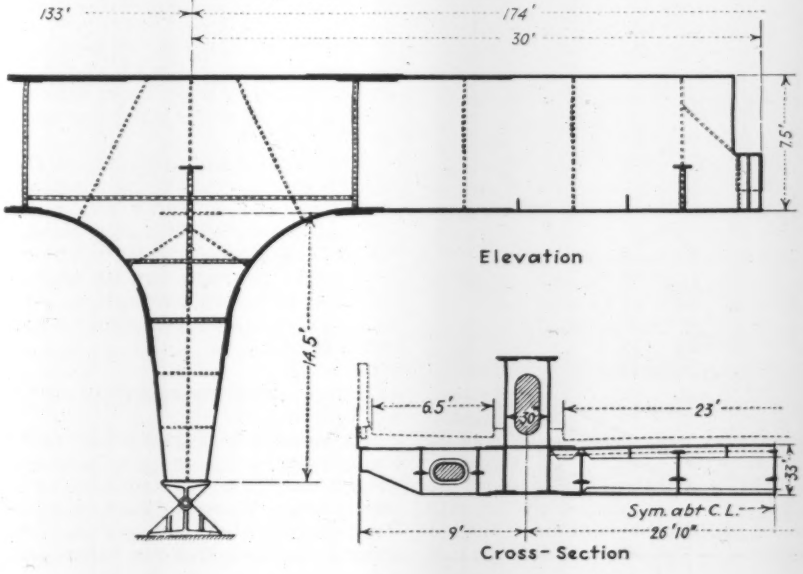
The main girders are of double-web type 7½ ft. deep with the webs spaced 30 in. apart. The top flange consists of a plate over each web with a cover plate 40-in. wide connecting the two. No cover plate is used on the bottom flange, to facilitate inspection and painting. The web plates are ⅜-in. thick and the flange plates ½ in. thick. Stiffener plates are placed at about 6 ft. intervals and on the inside of the webs only; the stiffeners of the two webs are connected at the top, center and the bottom by diaphragm plates.

Web splices are made by fillet welding plates on both sides of the web. Both butt and fillet welds were used to splice the flange and cover plates. Long diamond shaped splice plates were used.

Floorbeams and stringers are designed continuous. The floorbeams extend through the webs of the girders to support the sidewalks. The top flanges of the stringers are welded to plates that pass through the floorbeam webs.

Erection units consisted of the four pier legs, about five sections of girders for each span and the floorbeams, stringers and bracing. Welding started at one end and continued directly across the bridge. The floorbeams and stringers were erected as the work proceeded. It was specified that all welds should be laid down symmetrically, to reduce residual stresses. In spite of the utmost care some breaks did occur probably as a result of the operator not following the specified order of welding. Special facilities were provided to make the welders' work as easy as possible, to reduce fatigue. Specially rigid platforms were used and the working hours were shorter than usual. In addition to qualifying the welders and having inspectors watch the welding operations, each weld was examined with a magnifying glass for defects.

STRUCTURAL DETAILS of welded girder cantilever bridge in Tokyo, Japan.



Los Angeles Sewage-Plant Site Cleared by Relief Labor

Relief labor is being used at Los Angeles, Calif., to remove 4,000,000 cu.yd. of sand at the site of the new sewage sedimentation tanks at Hyperion (*ENR*, Jan. 16, 1936, p. 107). About $7,000,000 of PWA funds have been allocated for the tanks and accessories. When the fine-screening plant was built in 1924 and 1925 (*ENR*, June 3, 1926, p. 898) it was considered adequate for the conditions then existing. As the screens removed only 3 to 6 per cent of the solids and none of the greases, and since both the tributary population and the use of the adjacent beach for bathing are increasing, more complete treatment works are necessary. By the time the new works are ready for use, two years hence, it is thought that the screening plant will have justified its construction.

The new plant will serve not only 90 per cent of the population of Los Angeles but also Santa Monica, Culver Hills, Beverly Hills, Burbank, Glendale, Vernon and parts of Los Angeles County outside these cities. The San Pedro-Wilmington portion of the city of Los Angeles will be served by the Terminal Island sewage-treatment plant, now nearing completion.

Overtopping Causes Failure of Elk City Dam

Rainfall of 4.7 in. in two hours results in a flood that went over the top of an earth-fill water-supply dam whose spillway crest had been raised 2½ ft. recently to increase reservoir capacity

AN EARTH-FILL DAM forming part of the water supply system of Elk City, Okla., failed on May 1 during a rainfall of abnormal intensity. A report of the failure was published in our issue of May 7, p. 678. It was based on telegraphed reports from W. C. Burnham, engineer of the Conservation Commission of the State of Oklahoma, and W. R. Holway, consulting engineer, Tulsa. Since these preliminary reports were received additional information concerning the dam and the storm which caused its failure has been received from Mr. Burnham and Mr. Holway and the following is based upon their more complete reports, supplemented by data from a description of the dam published in our issue of May 27, 1926, p. 352.

The Elk Creek Dam on the west fork of Elk Creek was built by the city of Elk Creek, Okla., in 1925 from designs of the Benham Engineering Co., Kansas City. It is shown in plan in Fig. 2.

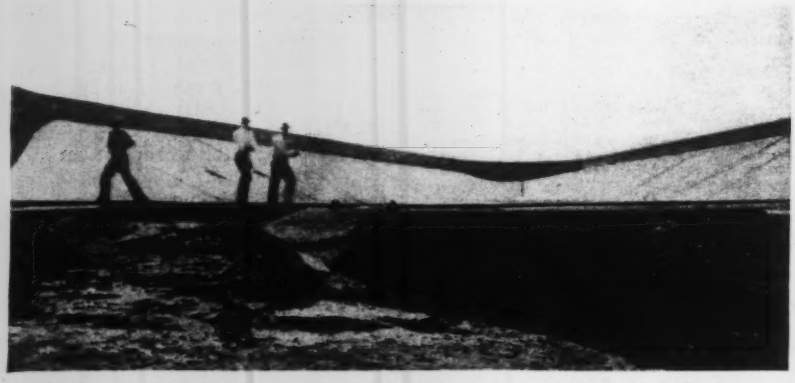
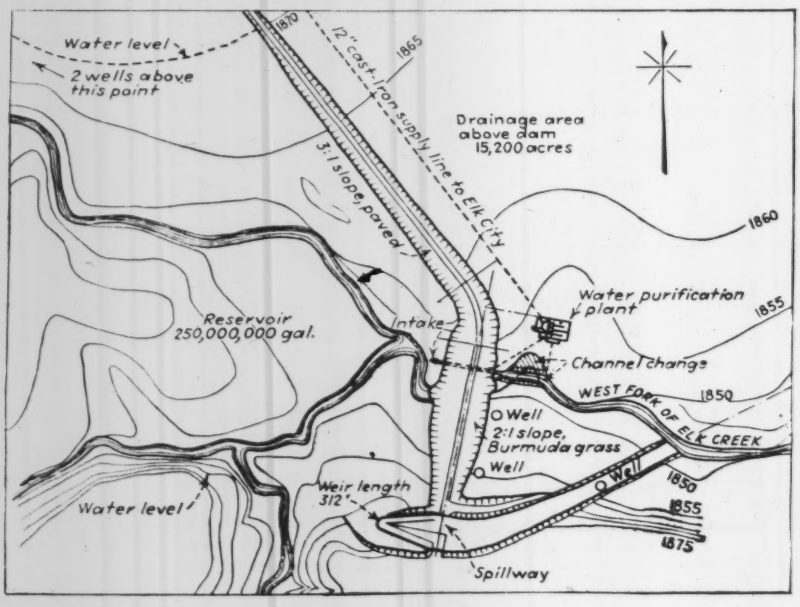


FIG. 1—THE SPILLWAY capacity of Elk Creek Dam was reduced in 1933 by building a 2½-ft. wall on the crest. This picture was taken looking up to the V-shaped spillway channel and shows the wall on the spillway crest. Heavy erosion occurred at the end of the spillway apron.

FIG. 2—ELK CREEK DAM was an earth fill about 2,000 ft. long and 30 ft. high at the highest point which was in the old stream bed where failure occurred.



Description of the dam

The dam is a rolled earth fill 850 ft. long, and has a maximum height of 30 ft. and a top width of 16 ft.; it is supplemented by a dike about 1,000 ft. long. For imperviousness, the main dam contains a concrete core wall extending from 30 ft. below the original ground level to near the top of the dam and having a thickness varying from 15 in. at ground level to 8 in. at the top. The core wall is surrounded by a puddled clay core. The remainder of the dam was built up of 12 in. layers of sandy clay wetted and rolled as it was placed.

The water side of the dam has a slope of 3 to 1 and is paved with a reinforced concrete slab 4 in. thick. The downstream face has a slope of 2 to 1 and is sodded with Bermuda grass.

Test borings taken at the time of construction showed that the core wall should be carried to a depth of 30 ft. for several hundred feet across the area adjacent to the original creek bed in order to cut off the underflow. On completion of the wall, water flowed under pressure from a 2-in. hole drilled to a depth of 15 ft. in the creek bottom above the wall, indicating that the underflow had been checked.

At the south end of the dam is a V-shaped spillway of reinforced concrete, built largely on rock, discharging into a paved channel that extends below the toe of the dam. This spillway has a length of 312 ft. and, originally, its crest was 5 ft. below the crest of the dam. With this depth it had a capacity 10,000 sec.-ft., which, at the time the dam was built, was considered adequate. There were then no records of maximum run-off from the drainage basin but cross-sections of the stream channel and examination of its banks indicated that it had not passed a flood in excess of 5,000 sec.-ft.

The reservoir had a capacity of 250,000,000 gal. when it was built, but there were losses of water through the underlying rock and loss of volume through silting; also, estimates of average annual yield were too high for the drought years that followed construction of the dam, and Elk City continued to have water troubles.

Spillway raised

As a result, in 1933 the city (without consulting the original designers) built a wall 2½ ft. high on the crest of the spillway, adding to the capacity of the reservoir but cutting down the capacity of the spillway to 4,400 sec.-ft.

In 1934 five wells were sunk in the neighborhood of the reservoir. One of these was in the spillway of the Elk Creek dam and two others were along the downstream side of the dam. They were sunk close to the dam into the underlying shale (which lies in nearly horizontal beds and has many vertical irregular fractures), in the hope of reclaiming some of the considerable quantity of water that was being lost from the reservoir by seepage. However, except for the well in the spillway channel which caught some of the seepage under the spillway slab, the wells below the dam yielded little more water than two wells sunk into the same underlying shale above the reservoir, namely about 75 to 100 gal. per minute.

The flood resulting from the overtopping and failure of the dam on May 1 put the motors of the wells below the dam out of commission and partly filled the wells with mud, but by May 3, three of the wells were in use again and the other two can be put into service as required. No damage was done to the water purification plant except flooding of the tanks.

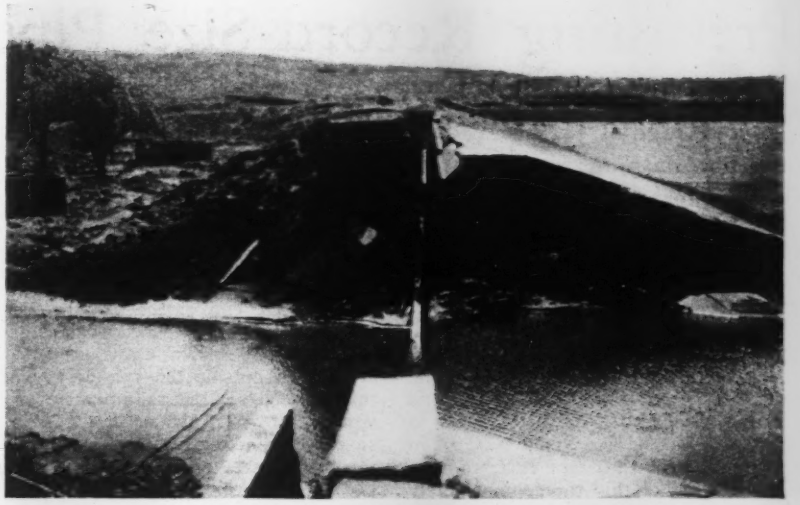


FIG. 3—THE WASHED OUT SECTION of the dam. Two of the city's emergency wells may be seen at the left.

FIG. 4—THE MAIN BREAK in Elk Creek Dam was about 150 ft. long. This picture was taken looking upstream through the dam toward the intake tower.

Record rainfall

According to Mr. Burnham, the rainfall was near the maximum that can be expected in Oklahoma. The Conservation Commission estimates that for a period of two hours the greatest concentration that can be expected is 6.6 in. or 3.3 in. per hour. This condition seems to fit the flood on the west fork of Elk Creek. There was a heavy rainfall starting about 9 p.m. Thursday, April 30, and continuing until 10 p.m.; from 10 p.m. until 10:45 as much as 3½ in. of rain fell. The official record at Elk City was 4.7 in., but a CCC camp near the drainage area recorded 5.75 in. and there is evidence according to Mr. Burnham that the fall was heavier west and northwest of the town on the drainage area of both the west and east forks of Elk Creek. The dam went out about 1 a.m., May 1.

Assuming 3.3 in. per hour, with 50 per cent runoff, the maximum flow was about 21,500 sec.-ft. With the original freeboard of 5 ft. on the crest of the spillway, this flow would have required a spillway length of 575 ft., whereas the dam was built with a spillway 312 ft. long, and that was constructed along the south side where the approach channel lies against the rock bluff.

Mr. Burnham estimates that the water was running over the entire length of the dam to a depth of about 1 ft. when the dam failed.

The drainage area above the dam is 23½ sq.mi. It is 95 per cent tertiary sand area and farm land, a fine sand and clay that will blow when dry, holds water well but packs tight under a driving rain. Only ½ in. of rain had fallen on the area since Jan. 1. The ground was swept clean by recent dust storms, and there were no growing crops of any consequence, thus favoring a high runoff. The reservoir was nearly empty when the storm began.

A second estimate of runoff

Mr. Holway estimates the maximum intensity of runoff at about 16,000 sec.-ft. or 680 sec.-ft. per sq.mi. of drainage area as compared with 425 sec.-ft. per sq.mi. allowed in the original design. He states that the same storm swept over the drainage basin of the Clinton (Okla.) water supply reservoir in which the water surface was 14 ft. 4 in. below the spillway crest when the storm started. The operator of the plant advised Mr. Holway that the water behind the dam rose 15 ft. in three hours and went over the spillway 8 in. deep. This 15-ft. rise represents a storage quantity of 3,560 acre-ft., which accumulated in three hours. Disregarding the amount that went over the spillway, this equals one-third of an acre-foot per second, a rate of runoff that is equivalent to 14,520 sec.-ft., average runoff, or 580 sec.-ft. per sq.mi. for a three-hour period. The maximum intensity, according to Mr. Holway, must have been much larger than this and probably equalled the maximum intensity of runoff estimated for the Elk City area, which appeared to him to have been uniform over an area of 200 sq.mi.

From a study of the size and weight of drift lodged on the top of the Elk Creek dam and from the erosion of the downstream face Mr. Holway estimated that the water was 18 in. deep over the crest when failure occurred.

Warning of year ago disregarded

That the Elk Creek dam was in danger of being overtopped and destroyed was indicated by the fact that the dam was topped and threatened with destruction in a rain storm last June. Nothing, however, was done about it.

Recently the city approved the issue of $350,000 in bonds to finance the sinking of wells along the north fork of the Red River, some twelve miles southwest of Elk City, and the construction of a pipe line to the wells. Contract for that work has been let.

Precasting Record-Size Pipe

Concrete pipe of 152-in. inside diameter weighs 43 tons per 12-ft. length—Finishing rods used after pouring give smooth surface finish—Steam speeds early setting—Sections turned over and rolled three days after pouring—Ten miles under construction

THE MAIN PIPE line in the distribution system of the Colorado River aqueduct leaves Cajalco reservoir headed northward toward the San Gabriel Mountains and then turns west to parallel that range en route to Pasadena's Pine Canyon reservoir in the foothills northeast of Los Angeles. That portion of this route immediately east of the city of Ontario for a distance of 9.6 miles is being laid as a precast concrete pipe line with the record-breaking inside diameter of 12 ft. 8 in. The internal pressure heads will reach a maximum of 80 ft. and will average between 55 and 60 ft.; the theoretical capacity of the line is 750 sec.-ft. The stress analyses used in design and the theory on which location of reinforcement was worked out are described in an article published in *Engineering News-Record*, March 12, 1936, p. 380.

A casting plant has been placed near the midpoint of the work and the scheduled daily production is sixteen sections 12 ft. long. These are hauled on low-body trailers to their place in the trench. The unusual size and weight of these sections has led to several innovations in methods and equipment used in casting and handling, the essentials of which are outlined in the following.

Reinforcing cages

The casting plant occupies a 300 x 1,000-ft. area, with a concrete-mixing plant about midway of the length, a reinforcing-cage assembly at one end, and ample space for a curing yard along one side. The daily production schedule requires about 325 cu.yd. of concrete and 40 tons of reinforcing steel.

All pipe sections are reinforced with two layers of steel, an inner system circular in section and an outer, elliptical layer. Both layers consist of round rods ½ to ¾ in. in diameter, wound spirally into the assembly and welded to the longitudinal rods. This steel arrives on the job in coils about 5 ft. in diameter weighing 1 to 1½ tons each. Each coil is of the proper length to make a continuous spiral the full length of the cage. The cages are wound on a machine designed expressly for this job with a view to giving any desired spacing of the windings. The rod in passing through the carriage mechanism is first straightened and then bent to the proper curve at the end of the arm before it goes onto the drum. The circular winding is put on first, after which spacers are placed outside the cylindrical cage thus formed and the elliptical layer is wound on over the spacers. These spacers are tubular frames of varying thickness placed so as to cause the second layer of reinforcement to shape itself exactly as intended. These spacers, which are withdrawn as soon as the completed cage has been welded, also serve to stiffen the assembly as it is withdrawn from the winding drum. At that time in addition to the spacers only four longitudinal bars are in place.

The winding drum is a steel cylinder cantilevered over a concrete pier from an anchor pier which balances the uplift. A variable-speed drive on the coil-carrying car, which moves lengthwise of the cylinder to guide the spiral winding, accurately controls the spacing of successive turns. In placing the spacers the first step is to fasten a longitudinal reinforcing rod along the line where the two layers should separate by the width of this rod. A little farther around the circumference a length of 1½-in. pipe is fastened in place. Next comes the first of the tubular frames, consisting of three pipes paralleling the center line of the cage, welded together with straps that give the frame a triangular section, thus allowing two of the three pipes to rest on the inner reinforcement, while the third provides a support for the outer reinforcement. For convenience in maintaining spacing and also in handling these frames, the larger sizes are joined by steel rods passing inside the pipes and linking together the triangular spacer units.

The entire system of spacers is put on quickly and accurately by the aid of guides. The latter are left in place until the winding is completed; thereafter the tension maintained in the rod during the wrapping of the second layer is sufficient to hold the spacers in place while the longitudinal rods are welded in.

The total area of steel per square foot of pipe section varies from 1.8 to 2.8 sq.in., with about two-thirds of this area in the elliptical cage. The bell of each section is reinforced with a separate cage consisting of three hoops of ⅞-in. round bars welded to 20 longitudinal bars 18 in. long and ½ in. in diameter. The weight of a cage completely assembled varies from 3,700 to 5,400 lb.

The cage is removed from the winding drum by an overhead gantry crane and placed on a bed formed of three belts spanning a pit, which support the cage in such a way that it can be rotated very easily, squirrel-cage fashion. Workmen who weld the longitudinal bars to the spiral winding to complete the stiffening of the steel cages stand on a blank support which does not rotate. Thus the welders can work in the most advantageous position while making welds entirely around the circumference.

Pipe casting operations

The pipe sections are cast vertically in forms consisting of bottom and top rings and inner and outer jackets. The bottom rings are fabricated by welding together steel plates and shapes and then machining all surfaces which come in contact either with concrete or jackets. These bottom rings are then set on concrete foundations and fastened down by anchor bolts.

As the inner and outer faces of the socket and spigot of the pipe must be cylindrical (not tapered) to prevent opening when the pipe contracts, it was necessary to form the inner face by a loose band on the bottom ring. This band is held in place with tapered pins which are removed before the pipe is lifted off the ring. As soon as the pipe has been lifted a foot or so, the band is removed from the pipe and dropped back in place on the bottom ring.

The inner and outer jackets or forms are of 5/16- and ¼-in. steel plates respectively. The outer form consists of a single steel sheet with one vertical bolted joint. The inner form has a small collapsible section which allows it to contract 2¾ in. to facilitate removal. Rings and forms were made with a tolerance of only 1/32 in. in diameters.

The plan of operation in the yard is to work to a daily production schedule of sixteen sections. The daily program includes lifting from their supports sixteen sections three days old, turning them on their sides and rolling them out into the curing yard. This program made it necessary to have only 48 form bases and 16 complete sets of forms. The form bases are in a row along one side of the curing yard, where they could be paralleled conveniently by the locomotive crane track.

In preparing a form assembly, the locomotive crane successively picks up inner form, reinforcing cage and outer form, setting each in place on one of the steel form bases. Resting on the inner form is a working platform or cover and top ring surmounting the section and holding both inner and outer forms circular and concentric. The platform is used by the workmen in getting the concrete into place effectively.

Spanning the form bases on a track of 18-ft. gage is a heavily built gantry which

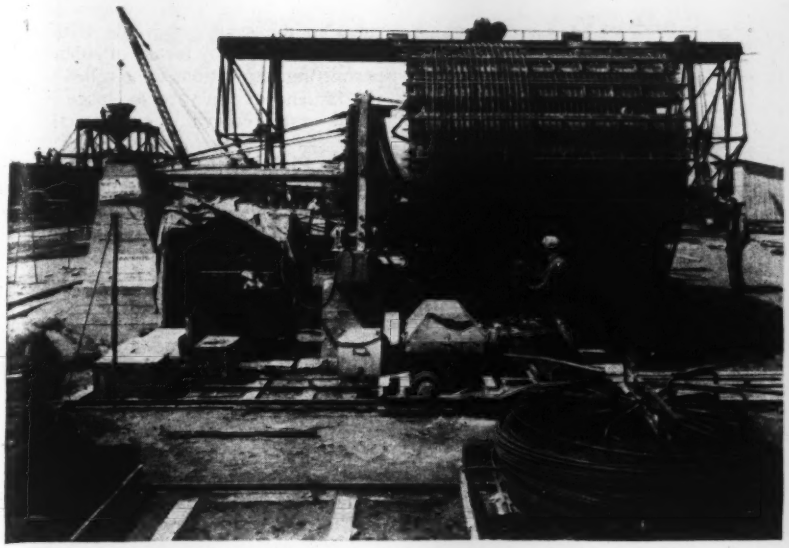


FIG. 1—WINDING rod into the reinforcing spiral. Note cantilever construction of the winding drum. In right foreground is the coil of ¾-in. rod from which the elliptical winding is taken; the speed of the electrically operated guide car carrying this coil determines the spacing of the spiral wraps.

FIG. 2—AGITATOR RODS are thrust into the pipe concrete after the forms have been filled. They are rotated by air motors and eliminate air and water pockets.

FIG. 3—GANTRY with two functions: a rotating spout below the hopper in the gantry deck distributes concrete into the pipe forms, and later the same rig lifts pipe sections and turns them over. Internal braces stiffen the pipe so that it can be turned as early as three days after pouring.

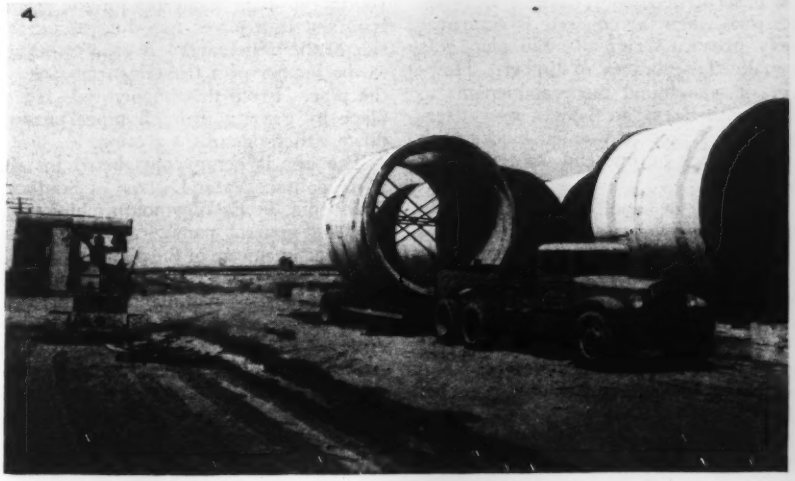
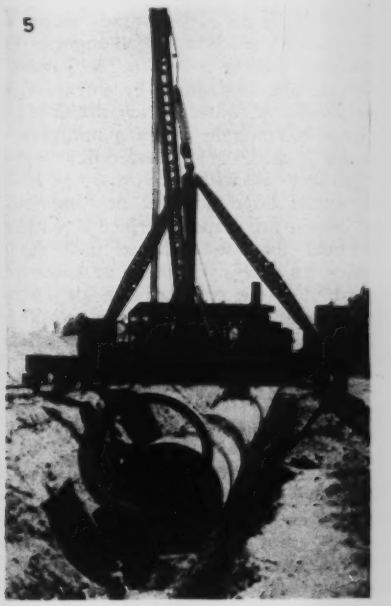


FIG. 4—LOADING a pipe section during which rollers on the trailer turn the pipe until it is in the proper position for laying, that is, with the minor axis of the elliptical reinforcement vertical.

FIG. 5—AT THE TRENCH the 43-ton sections are placed in position by a 48-ft. stiff-leg crane. Behind the crane is a traveling hopper from which concrete pipes extend down into the trench on both sides of the 152-in. line, delivering concrete to form the cradle beneath the huge sections.



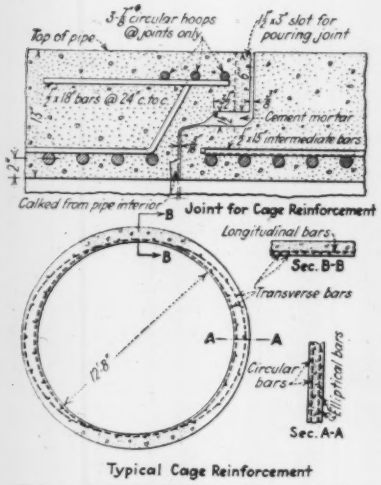
serves the dual function of concrete distributor and crane for lifting and turning the concrete pipe sections after the forms have been removed.

Concrete comes from a centrally located mixing plant; here a 4-cu.yd. mixer operates at a level whence it can discharge by gravity into batch boxes moved on surface tracks. Cement comes to the job in bulk and is stored in a 1,800-bbl. bin set at ground level, whence it is elevated to a smaller bin above the mixer. Bins for sand and graved also are in the superstructure above the mixer. All materials except water move by gravity into weighing devices controlled by electric eyes. Water is measured by meter in quantity to give the concrete a slump of about 4 to 5 in. in a batch containing 6¼ sacks of cement per cu.yd. Each train from the mixing plant carries two loaded concrete buckets of 2-cu.yd. capacity and empty space for a third. The train moves up alongside the locomotive crane, which first deposits in the vacant space an empty bucket and then successively delivers the two full buckets to the hopper on the gantry. When the second full bucket is picked up, the train promptly starts for the mixing plant leaving the crane to handle the last bucket while the train is away.

From the hopper on the gantry concrete is fed into the forms through a revolving trough. While the forms are being filled they are vibrated lightly by external vibrators to aid in settling the concrete and preventing rock pockets. On previous jobs with very large pipe, vibration alone was not found to give the smooth finish desired, particularly on the inside of the pipe, therefore finishing rods are put down inside the forms for the full depth of the section (after the concrete is in place) and are rotated along the inner and outer faces of the section. These rods are 14-ft. lengths of ½-in. square, reinforcing steel with offsets welded on at the lower ends. They are revolved by an air-operated tool of the type used for driving wood augers. Operation of these rods eliminates most of the surface pits caused by entrapped air or excess of water which are likely to occur in concrete where a minimum of water is used. It is believed that in these pipe sections, with a thickness of 13 in., it would be difficult if not impossible to obtain the desired surface smoothness without the use of some such device, unless an excessive amount of water were used. As the rods revolve air bubbles find their way up along the rods and can be seen as they appear at the surface. Their use also adds materially to the compaction of the concrete.

Curing and turning

Inside the rings which constitute the form bases are the delivery ends of two pipe systems; one for water and one for steam. For the first 5 to 8 hours after pouring, wet steam is used to raise the temperature of the concrete, to obtain early strength. After the forms are removed each section is covered and the interior walls are sprayed with water. The forms, both inside and outside, are removed on the morning next following the day of pouring, usually 12 to 16 hours after the pour, but the pipe section remains upright on the bottom ring for three days, when it is tipped on its side by the gantry and rolled out onto the rollways of the curing yard.



Typical Cage Reinforcement

FIG. 6—SECTIONS AND DETAILS of the precast concrete pipe.

As soon as the outside forms are removed from a section it is given two spray coats of cut-back coal tar; when the second coat is dry a coat of whitewash is applied, to reflect the sunlight and keep the temperature of the concrete as low as possible. When forms are removed the top of the pipe is covered immediately and the inside is kept wet by water sprays. After the pipe is tipped over a cover is placed on each end and the inside is kept wet by automatic intermittent sprays for the remainder of a curing period totaling two weeks.

Before the pipe is tipped on its side three sets of braces are placed in each section, one near either end and one in the middle. These are to stiffen the pipe and prevent deflection while it is rolled at a time when the concrete is comparatively green. Originally the plan was to make these braces of timber. However, it was found more convenient to brace with heavy steel pipes whose terminal faces receive wooden blocks with a trench jack on one end for tightening the braces.

The girdle or band by which the 43-ton pipe sections are raised from their bases is designed so that the lifting force draws it tighter around the pipe; that is, the force tightening the band is directly proportional to the force exerted in the lift. The gantry does not transport the pipe section, ordinarily, but merely turns it over on its side and rests it upon a timber support between the gantry rails. After the gantry has moved away the section can be rolled on timbers to its place in the adjoining curing row. Water connections to the sprinkler heads within the pipe sections are by means of rubber hose permitting the sections to be rolled toward the far end of the yard as space is provided by the removal of cured sections.

Placement in the trench

For most of its length this portion of the aqueduct is in private right-of-way parallel to and about ¼ mile south of the Santa Fe Railroad. The route is through open country used for field crops and grapes, with a few scattering orchards. The pipe sections are transported from the yard to the ditch on low-bodied trailers of 50-ton capacity attached to diesel trucks. Hauling is over a road constructed and maintained along the right-of-way by the contractor. At destination a sling is placed around the center of the section and the pipe is lifted off the trailer and lowered to position in the ditch by a stiff-leg derrick operated by a steam-hoisting engine on a 48-ft. gantry spanning the trench. Sections are brought into contact longitudinally by a ratchet puller anchored inside the laid pipe.

The trench varies from 18 to 28 ft. deep. It is excavated by a 3-cu.yd. dragline after a 12-cu.yd. carryall operated by a 75-hp. tractor has removed the top soil. Backfilling is done by the dragline aided by bulldozers.

The design of the pipe provides for two separate cement-mortar fillings at joints. One which is centrally located is poured as soon as the pipe is in place through an orifice at the top of the pipe provided for this purpose. This filling is then rodded with a flexible rod or cable. The second joint, filled from the inside of the pipe by pointing mortar into the open groove, is not finished until the backfilling has been completed and the line has taken a uniform temperature as well as any settlement that may follow application of the backfill load.

The laying of the pipe is followed by the pouring of the backfill cradle which supports the lower portion of each section. The cradle width varies with external loading; central angles vary from 100 to 180 deg. Concrete for the cradle is mixed in a paver traveling along the side of the trench and delivered by bucket to the hopper of a traveling carriage on the pipe. From this hopper it is fed to place by gravity through pipes passing down either side of the section.

The line is being constructed for the Metropolitan Water District of Southern California, F. E. Weymouth, chief engineer and general manager, R. B. Diemer, engineer in charge of the distribution system, H. R. Bolton, construction engineer. Contract for the manufacture and placement of the precast pipe is held by the American Concrete & Steel Pipe Co., of Los Angeles, H. H. Jenkins, vice-president, in general charge of the contract. Don Rankin is superintendent at the manufacturing plant and Jap Connell is job superintendent.

Letters to the Editor

Pipe Supports for Flashboards

Sir—The article by Clifford A. Betts in *Engineering News-Record* of April 30, p. 627, giving an account of tests on flashboards supported by pipe pins that will fail under a given head, is very interesting, but leaves the reader with the impression that the use of pipes for this purpose is something new in hydro-electric developments.

From 1922 to 1926 the writer was chief designing engineer of the Northern New York Utilities, Inc., and The Power Corporation of New York, (now parts of the Niagara Hudson system) engaged in the development of waterpowers in northern New York, and not only did we use pipe supports of this kind on the crest of concrete dams, but also used them in special cases, one of which is described below.

The Black River on which many of our developments were located is a flashy stream, being subjected to sudden floods that under some conditions make it difficult to control the rise of water quickly enough by means of stop gates or flood gates. In one of our smaller developments, the head race of the power house consisted of a canal running parallel to the Black River for some distance, the entrance to which was controlled by the usual head gates with provision for stop logs. The bank of the canal on the river side was a concrete wall designed as a gravity spillway section. This design was possible as the river bed is rock for the entire length of the canal.

As the power house was designed for full automatic control, and as it was necessary to use as much of the flow of the river as possible during stages of medium high water, it was decided to provide flashboards along the entire river side of the canal, supported on the top of the concrete wall by pipe pins, the pipes being so designed that if a sudden rise of the river took place, the entire set of flashboards would go out, beginning near the head gates, and thus the entire river wall of the canal would act as a spillway.

In such designs provision must always be made to prevent the flashboards from floating up and clearing the pipes as the water rises. In our designs we generally figured on the loss of the boards, it being better to lose a set now and then, rather than run the risk of them becoming jammed on the pipes, as these bent under the rising head. All these installations worked out in a very satisfactory way.

At that time W. P. Creager was vice-president and chief engineer of the before mentioned companies, with headquarters in Watertown, N. Y., and the designs and development of this type of flashboard with pipe pin supports, were worked out under his personal supervision and direction.

J. HARRINGTON GANDOLFO

Montclair, N. J.
May 22, 1936.

Life of Concrete Bridge Floors

Sir—In *Engineering News-Record* Feb. 20, 1936, there appears under the heading "Granite Block Chosen for Elevated Highway" an article relating to statements made by public officials, from which a casual reader might infer that the probable life of the concrete pavement on the Pulaski Skyway in New Jersey is only ten years.

The concrete pavement on the Pulaski Skyway has been in place and subjected to extremely dense vehicular traffic for a period of about 3½ years. The surface is now in the same excellent condition that it was when the concrete was placed and, due to its inherent qualities, the concrete is stronger than when the highway was first opened for traffic. Judging by present conditions and past experience, the surface of the concrete will remain suitable for traffic for more —and probably much more—than twenty years, and the slab itself will be able to carry the load of the vehicles for an indefinite period, the length of which may be fifty, one hundred or several hundred years.

When the concrete slab was designed, it was realized that, sometime in the far future, its surface might be worn or otherwise damaged to such an extent that the effective depth of the slab would be decreased, and for that reason the depth as constructed was made about 2 in. greater than that computed as necessary for carrying the load. If then, at a future time, the surface may become too worn, damaged or rough to be suitable for traffic, all or part of the upper 2 in. of the concrete slab may be removed, if necessary, and a new paving surface may be placed on the slab. It is not worthwhile at the present time to determine, or even to speculate about, what the type of this new paving should be. There are on the market now a number of types that could be used, and it is almost certain that, long before the resurfacing is needed, there will have been developed others suitable for the purpose.

Statements made in the article above referred to indicate that it is inferred by some that because cracks may be found in roadway-pavement slabs of concrete such cracks are likely to occur also in concrete bridge slabs without surface covering when used for vehicular traffic. It may be worth while, therefore, to review certain elementary characteristics of concrete bridge slabs and concrete roadway slabs.

A concrete bridge slab is a structural unit of reinforced concrete, supported at definite locations and capable of carrying a load. For many years it has been known how to design such a slab so as to keep the unit stresses of the concrete and steel used within safe limits. When properly designed and constructed, concrete bridge slabs have a probable span of life that may be measured in centuries rather than in years, and they have been used for many years for decks of bridges carrying railroads and highways.

Reinforced-concrete slabs have been used successfully without any surface covering for floors of office buildings and warehouses, but it is not until comparatively recently that they have been used without surface covering for highway bridges. The reason for this is that the concrete surface was not suitable as long as the traffic principally consisted of horse-drawn vehicles, but when these were replaced with rubber-tired motor vehices, the practical objections to the use of an uncovered concrete surface disappeared; in fact, it was found that a hard even concrete surface was one of the most desirable types.

A concrete roadway pavement slab is generally either unreinforced or only lightly reinforced as compared with a bridge slab. It differs fundamentally from a bridge slab in the respect that it is not as yet amenable to theoretical design. The roadway slab is supported on the subgrade of the road and is subject to a variety of stresses caused by the local variations and occasional changes in the support. The magnitude and distribution of these stresses are still too uncertain to permit the development of a rational mathematical design, and present designs of concrete roadway pavement slabs, therefore, are based largely on past practical experience.

It would, of course, be possible to construct a slab heavy enough and with sufficient reinforcement to withstand the stresses to which it might be subjected, but for economy, the natural tendency has been to begin with the use of a minimum amount of material in its construction, and if it was found to be insufficient, to use more material or to redistribute it until a slab was developed that would conform to the reasonable requirements for a pavement. For this reason it is not unusual to see cracks and breaks in concrete pavements, particularly in those constructed some years ago, but these cracks and breaks are generally not of vital importance because the pavement will still be able to function for the purpose for which it was constructed. As far as the surface wear that is caused by rubber-tired vehicles, experience indicates that within five or ten years the wear is so small as to be almost negligible.

SIGVALD JOHANNESSON

Trenton, N. J.
March 3, 1936.

ENGINEERING NEWS-RECORD

Volume 116, No. 23. Copyright, 1936, by McGraw-Hill Publishing Company, Inc.

EDITOR—F. E. Schmitt. EDITORIAL STAFF—V. T. Boughton, N. A. Bowers, W. G. Bowman, W. W. DeBerard, C. S. Hill, H. W. Richardson, E. J. Cleary

Editorial and Publishing Offices at 330 West 42d Street, New York.

June 11, 1936

Regulating Transport

DOES TRANSPORT present a national problem? Is coordination, consolidation and more extended legislative regulation needed to solve the admitted difficulties of transport? Have these regulations where tried proved a success? These active questions of the day are answered by a student of transportation in a series of articles begun in this issue. Few business subjects have been as furiously debated as that of transport, and in few debates have opponents and proponents been more disputatious. Under such circumstances it is too much to expect that the trenchant critique of the present writer will go unchallenged. But if it succeeds in taking some of the bigotry and buncombe out of current consideration of the really vital questions at issue its value will have been great. Even if nothing else could be said in their justification, the articles would have sound warrant for publication at the present time. But in addition they are widely instructive as to the facts of present regulatory practices and experiences. These have seldom been more illuminatingly set forth in brief space.

New Datum Points

IN VIEW of the remarkable heights reached by the March floods in the northeastern states, their maximum discharge figures as related to prior maxima constitute a significant set of new hydrological datum points. A compilation of the most complete figures available to date, brought together by the field organization of the U. S. Geological Survey in the table printed on another page in this issue, makes available source material for river studies and flood-control projects that is likely to be of controlling importance for a good many years. The practical meaning of such figures as these should soon be better understood, as a result of the increased attention that flood questions are now receiving, through the work of the Water Resources Committee, of state water authorities, army engineers, and private individuals and engineering groups. The studies of these agencies have their origin not only in the flood events of recent years but also in the focal position which river problems have taken in connection with our natural resources and public-improvement planning in the last few years. Until practical conclusions of broad scope result from these studies, however, the March flood figures must rank as primary guide points in the estimation of extreme flood flow.

Possibilities of Forecasting

IN CONNECTION with the tabulated flood figures it is well to recall the sensational experiences of such places as Harrisburg, Johnstown and Pittsburgh last March because of the gross inaccuracy of such flood warnings as were given. Predicted flood heights were far exceeded, and the result was worse than if no warnings had been issued, since the public was led to believe that precautions against extreme stages would be unnecessary. While probably no kind of forecasting would be of much help in the case of the Conemaugh at Johnstown, large rivers such as the Susquehanna and the Alleghany are amenable to timely prediction if full rainfall and discharge information is supplied from upstream points. Since the losses and suffering from floods can be reduced by reliable forecasting, many years before we are likely to obtain flood protection, a forecasting service ought to be created. How it is best organized is not a simple problem, but one that can be worked out. It may be either a state or a federal function, but the fact is that no present authority is charged with the responsibility or is equipped to carry it on. Perhaps state and federal cooperation is the answer.

Supervision Lacking

FAILURE of the Elk Creek Dam in Oklahoma again emphasizes the need for state supervision of all dams, old as well as new. That supervision should be continuous. Passing on the adequacy of the original design and supervision of construction is not enough, as the Elk Creek case shows all too clearly. Although the original spillway was of inadequate capacity for the flood of April 30, it is probable that the damage to the dam would have been much less had the city not cut down the capacity of the spillway materially a few years ago in an ill-advised attempt to increase the reservoir storage. Such a vital change in the structure could not have been made had the dam been under the close supervision of some state agency whose permission had to be obtained before any work could be done on the dam. Further, had a state agency been concerned with the safety of the dam its slight overtopping in the lesser flood of June, 1935, would have resulted in changes in the spillway that would have permitted the passage of this year's flood. That earlier flood would have resulted in a recheck of the original spillway capacity in the light of present records of maximum rainfall intensity in that part of Oklahoma, and those records would have shown that a storm of the intensity of that of April 30 was to be expected and should be provided for. But placing responsibility for the supervision of dams in the hands of a state agency is not enough. Such an agency must be provided with a staff adequate to make the supervision real. With hundreds of dams to be supervised, as there are in some states, real supervision is a continuing job of considerable magnitude.

Pre-Qualifying Is Better

CONTROVERSIES over the rejection of a low bidder on the ground of inadequate experience and qualifications to carry the work to successful conclusion are no new thing and nearly always they involve claims of discrimination, waste of public funds, and the like. That such charges are being injected into the discussion of a current case of the kind in New York is, therefore, neither surprising nor instructive. The ancient device for solving the problem is rejection of all bids and calling for new bids as often as necessary to bring the qualified bidder into the low position, if necessary by the aid of intimations to the undesired bidders that they will not be considered for the award. The notorious unfairness of this device is a fatal objection to its use, however, and it seems plain that where one or more low bidders are considered incompetent or under-financed or equipped the award should go to the lowest qualified bidder, except when the latter is clearly in the "complimentary" class. The real solution of the

problem, however, is pre-qualification, which if properly and honestly carried out will exclude the unqualified bidders and will set no limits to the entry of those who are qualified. It should be the rule in all public bidding—preferably by requirement of law, but in the absence of law by demand of the proper authorities.

For Traffic Safety

ONCE AGAIN AUTOMOBILE INSPECTION campaigns are being carried on here and there in the name of traffic safety. Under the promotion of officious civic bodies and alibi-seeking motor vehicle commissioners they are becoming a recurrent disease. Their accomplishments are small. Their main effect is to divert attention from the many needless dangers that are suffered to remain in our streets and roads. Between administration that is mileage-minded rather than safety-minded on the one hand, and flagrant violation of the elementary rules of safe traffic operation—for example, in double parking—on the other, new surprise obstacles and critical points for traffic movement are being created faster than engineering construction can reduce their number. The result is to increase traffic snarls and accidents. Then the "defective vehicle" bogieman is brought out of the closet and dusted off, and an inspection campaign is started, so that the local officials may gain recognition for vigorous safety work, and perchance the town's automobile dealers obtain a few added sales. It would be better for safety if these hoary rackets were discontinued and attention were focused on the dual objective of correcting the bad spots in the traffic network and eradicating ignorant or heedless traffic habits by enforcement.

Two Kinds of Business

IT IS COMMON in partisan discussion to denounce any measure for the regulation of business as interference with free enterprise and competition, or as destructive regimentation. Such denunciations are properly discounted, for everyone knows that many business practices need to be restrained. On the other hand, it is difficult to find redeeming features in supposedly regulatory legislation that would divide all industry and business into two kinds—that which supplies the government, and that which supplies the people. Just this is the effect of the Healey bill which was in the limelight a year ago and now is again being urged on the closing Congress.

The bill proposes to dictate wages and hours to all who would sell goods or services to the national government. The wages are to be the "prevailing wage," to be determined not judicially but by the arbitrary decision of the Department of Labor, partisan of organized labor interests. That the working conditions so imposed would differ from those prevailing elsewhere in industry goes without saying, for the proposed governmental regimentation would be quite unnecessary if the wage and hour practices current in industry were accepted and approved. In effect as well as intent the bill is a wage-raising measure to apply to a limited section of industry.

Whether or not construction is to be included in the scope of the measure—the matter is yet uncertain—it has quite the same reasons for fighting to keep such legislation off the statute books and out of the courts as any other section of industry, or for that matter, any citizen. All would suffer alike from the inauguration of a system of two industries and two labor classes and the control of one of these groups by an administrative agency biased by purpose and tradition in favor of class interest and against the public interest.

Who would be aided by thus dividing industry into two separate groups? Surely not the worker, who would find his employment opportunities limited and his pay status in constant doubt. Surely not the public, which would have to pay the losses resulting from destruction of productive efficiency and opportunity for steady employment. And surely not industry itself. An industry in the government group would be debarred from producing for general public consumption, and vice versa. Business enterprises that now produce in part for government supply would have to reorganize or close up.

Were time available for full consideration by Congress so harmful a bill could not pass. In the hurry of the end of the session anything may happen, however, and rumors of political bargains between labor and government interests to force the bill through do not give the situation a better look. It is a proper subject for action by engineers, the construction industry and private citizens, to insist that their representatives shall not approve this destructive measure.

Frost Damage Too Great

A DISTRESSING ACCOUNT of road damage caused by the cold weather of last winter is concluded in this issue. Because of frost breaks many millions of dollars are being expended to restore highways to the condition in which they were last fall. The most serious side of the matter is that, while the winter was unusually severe, this damage nevertheless is a recurring experience.

Last winter's cold was more intense and the frost zone extended farther; in all other respects the experiences of winter damage told so graphically this week and a week ago are no different from those of past springs for many years. The fact that every year the spring breakup calls for many weeks of special road maintenance is an indictment of roadbuilding, not of nature's action. The evidence is conclusive that present roadbuilding practices should be restudied to cut down the recurring losses.

Road money is being spread dangerously thin; in a popular demand for mileage, thousands of miles of unstabilized and undrained subgrades have merely had their surfaces smoothed over and slightly toughened, and the result is that when frost hits the subgrade the surface promptly goes to pieces. This statement sums up in a word the story of winter damage. While snow removal plays a part in producing rutted shoulders and gouged surfaces, the heavy destruction is wrought by freezing water under the surface. If this type of damage is to be ended, subgrades must be stabilized.

A question of public policy is also raised by the concentration of winter failures on low-cost roads. The increased maintenance costs of improvements too weak to withstand the natural forces of weather may more than offset any value of increased mileage gained by savings in first cost. It appears that the present emphasis on low-cost road mileage may create a burdensome maintenance obligation for future years, and thereby may curtail needed construction. Getting the farmer out of the mud may easily get the road-improvement program into bankruptcy.

CURRENT NEWS

Congress Passes Flood Bills

Conference reports on omnibus and Overton flood control bills approved by both houses and go to President

CONGRESSIONAL action on the two pending flood-control bills was completed last week when the reports of conference committees on both the omnibus and Overton measures were promptly approved by the House and Senate. Both measures have gone to the President.

In its final form the omnibus flood control bill, authorizing several hundred projects, located in all sections of the country at a total cost of $300,572,300, was substantially the same as when passed by the Senate. The policy statement accepting flood control as a proper activity of the federal government in cooperation with the states was retained. Minor amendments preserved the status of previous projects and exempted reclamation projects from the scope of the bill. Projects on the St. Francis and Yazoo rivers, already covered by the Overton bill, were deleted. Local governments will be required to provide the necessary lands, assume damages and operate and maintain the works after completion. The President will determine the order in which the various projects will be undertaken.

The Overton bill, limited to the lower Mississippi River, authorizes projects totalling $272,000,000 comprising a floodway system proposed by General Markham, Chief of Engineers. The principle of local contribution, bitterly opposed by the lower Mississippi states, was retained. The 26 reservoirs on the Arkansas and White rivers were dropped.

New York State Appropriates For Flood Control

Governor Lehman, on June 5, signed the last of a series of bills aimed at establishment of a flood control policy in New York State. The new acts contain the following provisions:

1. Establish a temporary commission, composed of four senators, four assemblymen, and four persons to be appointed by the governor, having power to negotiate with the federal government on matters concerned with any flood control measures the federal government may take.

2. Appropriate $25,000 to meet the expenses of the above-mentioned commission.

3. Amend the conservation law of 1911 to give the state Water Power and Control Commission power to organize drainage and flood control districts. The commission is empowered to draw up plans and prepare estimates for work to be done by the districts. The cost of such work shall be met by assessments on property within the district, in proportion to the benefits received by that property from the flood control or drainage project.

4. Appropriate $275,000 to meet the state's share of the cost of flood control projects participated in by the federal government. These funds would be used to finance the relocation and reconstruction of state highways, for channel improvement, dams, purchase of right of way, and the relocation of buildings and public utility lines.

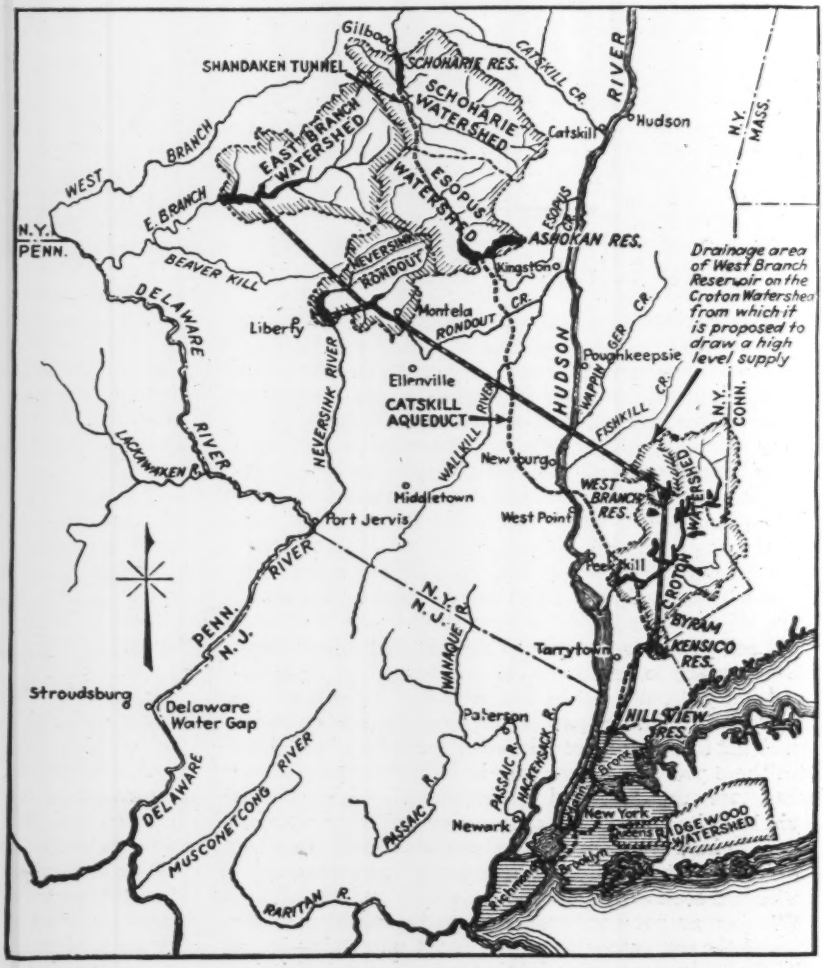
Lehman Signs Amendment To Triborough Bridge Act

An amendment to the act creating the Triborough Bridge Authority (N. Y.) giving it power to construct and maintain a toll bridge across the East River from Whitestone on Long Island to the Bronx was signed on May 21 by Gov. Lehman.

New Water Supply For New York City

Appropriation of $17,500,000 authorized for initial construction on the Delaware River project.

THE LONG DELAYED development of the Delaware River project which will provide additional water supplies for New York City was brought a step closer to realization on June 5, when the Board of Estimate authorized an appropriation of $17,500,000 in corporate stock to be used by the Board of Water Supply. This allotment will cover the costs of sinking shafts on 85 miles of tunnels and the preliminary work on three reservoirs. The total cost of the completed project will be about $272,000,000, and the construction program



ADDITIONAL WATER SUPPLY facilities for New York City will be provided by the construction of impounding reservoirs on the East Branch and Neversink tributaries of the Delaware River and on Roundout Creek, which flows into the Hudson River. An 85-mi. tunnel aqueduct will convey the water to the distribution system of the city.

will occupy a period of from seven to ten years.

Legal and financial obstacles have hindered the development of the Delaware system for nearly fifteen years. In 1922 when New York City anticipated that a shortage of water would soon be impending, the upper reaches of the Delaware River in New York State were found to offer the best and cheapest supply. Interstate interests complicated the situation, and New Jersey brought an action before the Supreme Court to prevent the proposed diversion. The court, in 1931, confirmed the finding of a special master, giving to New York the right to develop a portion of the upper waters of the river.

After this legal victory, further postponement occurred, because the city's credit became impaired. No funds were available until this year, when an item of $20,000,000 was included in the capital outlay budget.

Present water consumption in New York is close to 1,000 m.g.d., and the available supply is only about 1,039 m.g.d. The new supply will provide an additional 540 m.g.d.

The Delaware project contemplates the development of two tributaries of the Delaware River, the East Branch and the Neversink River, also the upper Roundout Creek, a tributary of the Hudson River, by the construction of reservoirs on these streams. Water will be delivered through a pressure-tunnel aqueduct across the Hudson valley to the West Branch Reservoir of the Croton system and thence southerly through the Kensico Reservoir to the Hill View Reservoir.

Michigan Moves Against Stream Pollution

Oil operators and chemical plant are ordered to provide means to prevent pollution of the Saginaw River

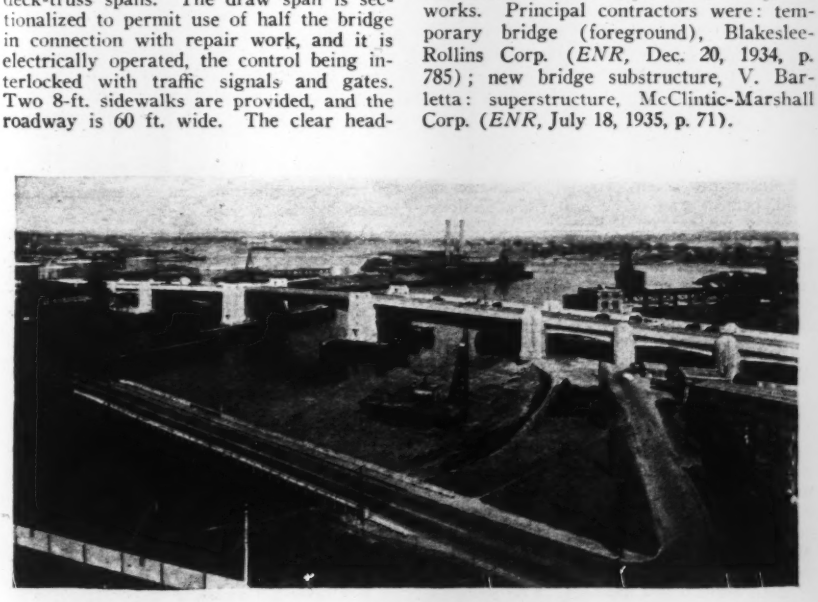
THE MICHIGAN state Stream Control Commission on May 27 issued a group of orders aimed to clear up pollution of the Saginaw watershed. The commission directed oil operators of the Crystal and Vernon fields to take immediate steps to return brine, a waste product in oil production, to formations underground. It also ordered the Dow Chemical Co. of Midland to provide "permanent means of waste disposal satisfactory to this commission," not later than Oct. 1, 1938. In the meantime the company must devise and place in effect temporary measures which will "substantially improve conditions at the Saginaw watershed and restore . . . the legal rights of the commercial fishing industry in Saginaw Bay." The commission stated that the Dow Co.'s wastes had rendered Saginaw's public water supply unusable for many domestic purposes, and that fish in the Saginaw River had acquired a distinctive taste because of the Dow wastes. "It is incumbent on the company," the order announced, "to progressively diminish, in so far as practicable, its share of chloride pollution at Saginaw."

Vernon Field oil operators must submit plans by June 15 for pumping brine back into the ground, and put these plans into effect in 30 days after their approval by the commission. Crystal Field operators must submit plans by July 1, and make them effective within 60 days after approval.

William M. Peck, assistant division chief of the Pure Oil Co., announced that experiments are about to be made in which brine will be pumped into glacial drift about 240 ft. beneath the surface. If this experiment is successful, it will be possible, Mr. Peck said, to put 200,000,000 barrels of brine into a 10-acre tract.

New Fore River Bridge In Massachusetts Opened

The new 6-lane double-leaf bascule over Fore River between Quincy and Weymouth, Mass., was dedicated on May 23. The bridge, 2,116 ft. long from end to end of wing walls, has five plate-girder spans, each 90 ft. long; a bascule 219-ft. long between bearing centers; and two 212-ft. deck-truss spans. The draw span is sectionalized to permit use of half the bridge in connection with repair work, and it is electrically operated, the control being interlocked with traffic signals and gates. Two 8-ft. sidewalks are provided, and the roadway is 60 ft. wide. The clear headroom above high water is 40 ft., which is expected to reduce the openings formerly required by one half. The fixed bridge has a concrete deck with bituminous surface, the draw span a laminated wooden deck with asphalt plank. Bridge lighting will be by sodium vapor lamps. A traffic circle will shortly be built on the Quincy approach. The bridge represents a total cost of about $2,000,000, and was built by the Massachusetts department of public works. Principal contractors were: temporary bridge (foreground), Blakeslee-Rollins Corp. (*ENR*, Dec. 20, 1934, p. 785); new bridge substructure, V. Barletta: superstructure, McClintic-Marshall Corp. (*ENR*, July 18, 1935, p. 71).



THE FORE RIVER BRIDGE was opened to traffic May 23

John Hays Hammond, Engineering Pioneer, Dies

John Hays Hammond, Sr., mining expert, died June 8, at the age of 81. Mr. Hammond graduated from the Sheffield Scientific School of Yale University in 1876, and later studied mining engineering at the Royal School of Mines in Freiburg, Saxony. He served as special expert for the U. S. Geological Survey, made numerous investigations in Mexico and South America, served as consulting expert for gold mines in the western United States, and in 1893 went to South Africa. There he worked with Barney Barnato and Cecil Rhodes, and was, for several years, consulting engineer for the Consolidated Gold Fields Co. of South Africa, the British South Africa Co., and the Randfontein Estates Gold Mining Co. Returning to America, he became consulting engineer for the Guggenheim interests, a position which he held until 1907.

Mr. Hammond has been active in mining and political affairs. In 1929 he was awarded the Saunders gold medal of the American Institute of Mining and Metallurgy. He was a past president of the American Institute of Mining Engineers.

Government Wins Cape Cod Canal Dike Case

The suit entered in the United States District Court at Boston, Mass., by Philip Stockton, seeking to restrain the War Department from building a dike about 11,000 ft. long off his estate at Great Neck, Buzzards Bay, as a part of the widening and deepening project on the Cape Cod canal, has been decided in favor of the government. The Stockton claim asserted that the dike was not specifically a part of the $20,000,000 project approved by Congress. The court found that the United States engineers possess authority from Congress to build the dikes as auxiliary to an improved channel at Buzzards Bay, which will provide a more direct route than the existing channel. The decision was based on the clause in the enabling legislation which gave the engineers authority to make changes in the plans.

The dike, one of a number to built in connection with the canal improvement, will be built by hydraulic dredging; it will be 480 ft. wide at the top at m.l.w., and at the highest point will extend 4 ft. above m.l.w. It will protect the canal against ice driven toward it by northwest winds, and prevent cross-currents through the channel in this vicinity.

Healey Bill May Pass

Washington Correspondence

DECISION of the House Judiciary Committee to report a revised version of the Healey bill to control wages and hours on government contracts indicated that a strong effort will be made by organized labor, with the consent of the Administration, to secure enactment of this measure before Congress adjourns.

House bill milder than Senate bill

As approved by the committee, the bill is much less drastic than the companion measure, sponsored by Senator Walsh of Massachusetts, which passed the Senate last summer. It now applies only to contracts "for the manufacture or furnishing of materials, supplies, articles and equipment in any amount exceeding $10,000" entered into by any government agency (including the District of Columbia) and any corporation wholly owned by the United States. Such contracts must stipulate that (1) the contractor is either the manufacturer of or a regular dealer in the supplies concerned; (2) that persons employed by the contractor in fulfillment of the contract will be paid at least prevailing wages, as determined by the Secretary of Labor, and shall work not more than 8 hours per day, or 40 hours per week; (3) that no person under 18 years of age, nor any convict labor, shall be employed; (4) that working conditions shall comply with state safety and factory inspection laws.

Specifically exempted from the provisions of the bill are supplies bought in the open market, unless specially manufactured to particular specifications; perishable articles; agricultural products; and the transportation of persons or goods. Special exceptions to its provisions may be granted by the Secretary of Labor. The bill does not interfere with or modify the Bacon-Davis Act, nor does it apply to projects financed through the Relief Act of 1935.

Doubtful whether construction is affected

Whether or not the phrase "materials, supplies, articles and equipment" includes public works construction is a matter of interpretation. Committee sentiment is that such construction is not covered, but opponents of the bill point out that the wording is ambiguous and might be interpreted either way. Furthermore, should the bill go to conference it is possible that the more stringent wording of the Walsh measure might be adopted in whole or in part so as to bring construction within the scope of the measure.

A similar uncertainty affects the question of whether or not subcontractors are covered. Although the revised bill does not mention them, strict interpretation of certain sections might be construed to render a principal contractor liable for the actions of his subcontractors, and here again changes in conference would affect the issue.

Present expectation is that the revised bill will be passed promptly by the House and will be sent to conference. What will happen thereafter depends largely upon the Congressional situation, but there is a strong possibility that the bill in some form will be enacted before adjournment.

Brooklyn Vehicle Tunnel Approved by City

The New York City Board of Estimate has approved plans, prepared by the Board of Transportation, for a vehicle tunnel from the Battery in Manhattan to Hamilton Ave., Brooklyn. The plans have been sent to the New York City Tunnel Authority with a request for immediate construction.

The proposed tunnel is estimated to cost $60,309,000. It would be 5,900 ft. in length, 400 ft. longer than the Holland tunnel. It is proposed to construct two separate tubes having an external diameter of 30 ft. 8 in.

The New York City Tunnel Authority is an independent state agency having power to issue bonds secured by the income from such tunnels as it may build. It was set up originally to build a tunnel under the East River, a project which it is about to build with funds supplied by the Public Works Administration. It has no funds for the Brooklyn tunnel.

Contractors Must Pay Arkansas Sales Tax

In a suit, filed by M E. Gilioz, Williams Brothers, Inc., and B. & M. Construction Co., seeking to restrain the Arkansas state revenue commissioner from collecting the two per cent sales tax on $681,615 in materials used in construction of a water supply system at Fort Smith, Ark., the Pulaski County chancery court ruled on May 13 that a contractor is a consumer of materials rather than a retailer and is subject to payment of the sales tax and that the state has the right to bring suit for recovery of sales tax. It was also held that the city of Fort Smith is not the ultimate consumer of the materials in question and hence is not subject to payment of the sales tax.

In another suit, brought by the state highway commission to restrain the commissioner from collecting the sales tax on purchases of sand and gravel and other road building materials on which a severance tax has been paid, the court sustained a demurrer filed by the defendant, holding that the severance tax is an excise tax and not within the constitutional clause prohibiting double taxation.

In holding that the contractor is a consumer, the court pointed out that it did not "see how the court can hold that use of sand, cement and other materials, if done under a contract to deliver a single completed unit, can be construed to make the contractor a salesman of the materials. The city is not the consumer. The contractor does not sell labor and materials to the city, and hence he is the consumer."

PWA Engineer Acquitted

Charles R. Olberg, former PWA engineer-examiner, and six other defendants to an indictment charging conspiracy to defraud the government on an irrigation project in Willacy County, Texas (*ENR*, March 28, 1935, p. 464), were acquitted on June 8 by a jury in the Supreme Court of the District of Columbia. The trial, on evidence furnished by the Public Works Administration, extended over a period of several weeks. The charges involved a change in specifications for the project, by which a proposed open gravity system was converted into a high and low pressure system in which the bidding would be confined to redwood pipe. Conspiracy to influence the PWA decision on the Willacy project also was charged.

Washington Highlights

By Paul Wooton

THE BONNEVILLE power bill, establishing a permanent policy for the disposition of federal power, (*ENR.*, May 28, 1936, p. 792) has been favorably reported to both houses. A strong effort will be made to pass it.

Senator Wagner's public housing bill, reported by the Senate Committee on Education and Labor June 1, apparently is dead so far as this Congress is concerned. The New York senator sought to bring up the bill on June 6, but was frustrated by parliamentary maneuvering. The bill as reported would confine immediate appropriations to $10,000,000. It would create a United States Housing Authority to supervise and aid in financing low-rent projects initiated by local authorities. Without funds to expand PWA's housing program, Administrator Ickes lost interest in the Wagner bill when control was put in the hands of what he termed a debating society.

President Roosevelt has signed a joint resolution authorizing fourteen states in New England and in the Ohio Valley to negotiate interstate compacts for flood control and the prevention of stream pollution. No such agreement shall be binding upon any state until ratified by its legislature, nor upon the federal government until approved by Congress.

Consent of Congress to such agreements is required because section 10, article I of the Constitution provides: "No state shall, without the consent of Congress . . . enter into any agreement or compact with another state."

The Senate on June 6 passed the following:

A House bill permitting states to enforce workmen's compensation laws on federal construction projects. As passed by the House, the bill also applied to safety and insurance regulations, but these were eliminated by the Senate.

A House bill permitting revenues from proposed transmission lines at the Coolidge Dam, San Carlos, N. M., Irrigation and Drainage District, to be earmarked for the repayment of REA loans. The present statutory disposition of project revenues is retained for all revenue over and above REA charges. The bill has passed the House in the same form.

House bills authorizing preliminary flood control examinations of the Kennebec River, Maine; Six Mile Creek, Logan County, Ark.; headwaters of the Allegheny and Susquehanna rivers.

House bills extending the times for commencing and completing bridges across the Missouri River near Arrow Rock and Miami, Mo.

A House bill authorizing construction of a bridge across Chesapeake Bay.

Brief News

THE MEMPHIS, TENN., CITY COMMISSION, has passed an ordinance providing for the sale of $3,000,000 worth of the $9,000,000 bond issue approved by Memphis voters November, 1934, to acquire or construct a distribution system for TVA power. Date of the sale has not been fixed, and depends on the progress in preparation of plans and specifications for the distribution system. Authorization of the bond sale at this time will save the city a delay of 14 days when the city is ready to advertise.

AN AERIAL SURVEY of the Illinois and Mississippi Canal is being made by Army Engineers of the Rock Island District as part of a $75,000 study to determine the economic feasibility of improving and deepening that waterway. Funds for the work were supplied by Congress in the last Rivers and Harbors Act. Known locally as the Hennepin Canal, the waterway is a 75-mi. connection between Rock Island, Ill., on the Mississippi River and Bureau, Ill., on the Illinois River. It was completed in 1905 at a cost of $7,224,000. Spanned by a great many low-clearance bridges, having 32 hand-operated locks 135 ft. long and 35 ft. wide, and furnishing but a seven-foot channel inadequate for modern barge tows used on the Upper Mississippi, the canal is little used despite the fact that it provides a 190-mi. barge line from Rock Island to Chicago. Lieut. Kurt M. Landon, commander of the 21st Photo Section of Scott Field, Belleville, Ill., will be in charge of the aerial photography. The photos will be taken from an altitude of 10,000 ft. A strip one mile wide throughout the entire length of the canal will be photographed.

AN ALLOTMENT OF $300,000 WAS MADE, May 30 by the War Department, for dredging the ship channel across Egmont Bar, Tampa, Florida, to a depth of 32 feet. The work will start July 1. This is part of the $3,675,000 development program for the port of Tampa.

TOLEDO, OHIO, will increase its area an additional 1¾ sq.mi., by the annexation of Point Place, a summer colony on the north of the city. By this move, which is expected to take place at the beginning of 1937, 4,651 will be added to the population of Toledo and $4,740,107 will be added to the tax duplicate. This extension of the city's boundaries will bring them to the Michigan State line. The elimination of Swan Creek, formerly a navigable stream, running through Toledo, is proposed by the Chamber of Commerce to be accomplished in 1936-37. The stream drains an area west of the city extending into Fulton county. Its waters would be diverted to the Delaware creek valley. Twelve highway and three railroad bridges would be eliminated by the change in the stream.

THE NEW SOUTH LONDON AIRPORT at Gatwick, a photograph of which was shown in last week's issue, was officially opened on June 6. The new airport is expected to relieve the growing pressure on Croydon. It can be reached in 40 minutes from the Victoria Station by train.

THE CONTRACTORS for the Knoxville, Tenn., municipal power distribution have canceled their contract. This action was because of the long delay in the work, due to the injunction obtained by the Tennessee Public Service Co., holders of the franchise at Knoxville. The contractor, Hess & Barton, Inc., Pittsburgh, Pa., have filed a suit against the Public Service Co. seeking $50,000 damages on account of the delay.

PRESIDENT LAZARO CARDENAS of Mexico has instructed departments in charge of federal public works to obtain materials and equipment which must be obtained abroad by barter—to swap such Mexican products as rice, salt, sugar, chick peas, corn and alcohol for the articles. The ministry of communications and public works is making a list of machinery, tools, equipment, etc., that are required for the government's construction program.

THE SEABOARD AIR LINE WILL CONSTRUCT 10 miles of railroad, at a cost of $187,000, in Florida. Diverging from the main line at Plains, in Highland County, the branch will tap the land bordering Lake Istokpoga, an undeveloped area adapted to vegetable production. In approving the project last week, the Interstate Commerce Commission remarked that construction in advance of development necessarily involves some risk, but that there is a reasonable prospect that the line will pay for its cost, especially since plans to build a highway that would parallel the line seem to be dormant.

A MOTION FOR A NON-SUIT has been granted by the Los Angeles County Superior Court in the first suit to be brought to trial for flood damages, in the New Years day, 1934 floods, in the Montrose-La Crescenta area. The action was directed against the Los Angeles County Flood Control District, seeking $50,000 damages. The suit was the first of about eighty pending actions against the district. Many have been disposed of before reaching trial. The plaintiffs charged the flood damage was due to the failure of the flood control district to complete an omitted link in the concrete channel constructed by the district. Dismissal was asked on the theory that no legal wrong had been committed by the flood control district and that the plaintiffs had not proved a cause of action.

Aerial Explorations Photo

SECOND PIER IN SUPER-LINER TERMINAL GOES INTO SERVICE

In the glare of publicity that attended the arrival of the Cunard-White Star liner *"Queen Mary,"* the new pier which received her, and which is quite as notable in its field as the liner is in hers, received scant attention. One of three 1,100-ft. piers forming a new super-liner terminal for the Port of New York, the *"Queen Mary's"* pier is the second of the group to be opened; the pier at the left in the attached view, when complete, will serve the Italian Line boats, while the third pier from the left has provided docking facilities for the French Line's *"Normandie"* since its maiden voyage, June 1, 1935.

Three stories high, the pier shed at which the *"Queen Mary's"* passengers landed is equipped with elevators and escalators, so that horizontal gangplanks can be used in place of the old inclined type. Constructed of fireproof materials throughout, the new pier provides the most modern ship terminal facilities yet built. Its dimensions, 125 ft. wide and 1,100 ft. long, are unequaled in any port. The extreme length made possible inside of the pierhead line by extending the piers landward, a construction operation which required one of the largest cofferdams ever built (*ENR*, Aug. 3, 1933, p. 123). The land end of the pier is on fill between concrete retaining walls; the outer 780 ft. consists of a concrete deck on timber piles. The shed includes a brick-enclosed headhouse at either end; elsewhere the enclosure consists of steel sash and rolling steel doors. The slips between the piers are 400 ft. wide and have a depth of 46 ft. at low tide.

PWA Power Loans to Cities Held Constitutional

Chief Justice Alfred A. Wheat of the District of Columbia Supreme Court, on June 5, upheld the constitutionality of PWA allotments for power plant construction to ten municipalities in Alabama, Texas, Oklahoma and Iowa.

The suit was brought by the Alabama Power Co., the Texas Utilities Co., the Oklahoma Utilities Co. and the Iowa City Light & Power Co. in an attempt to enjoin PWA from making loans and grants to the cities of Decatur, Florence, Sheffield, Tuscumbia, Guntersville, Hartselle, and Russellville in Alabama; Plainview, Texas; Hominy, Oklahoma; and Iowa City, Iowa.

Three Silicosis Bills Become Law in New York State

Three bills relating to silicosis, passed by the New York State legislature, have been approved by the governor. One limits the compensation for silicosis to $3,000. Its purpose is to revive industries in New York state in which there is a silica dust hazard, industries that have been seriously affected by high compensation rates for silicosis protection. It also calls for the use of dust-control devices in all such industries. Another bill appropriates $50,000 for a study of dust diseases, and the third establishes a fund of $100,000 for enforcement of preventative measures.

New York Fair Grading Contract Goes to Third Low Bidder

Contract for grading the site for the world's fair to be held in New York in 1939 was awarded to the third low bidder on June 9. A low bid of $1,843,775 was submitted by the D.M.W. Contracting Co. of Brooklyn, and the second low bid of $1,967,525 was submitted by S. J. Grove & Sons Co. Park Commissioner Robert Moses objected to awarding the contract to either of these two on the ground that they were not equipped to handle the work in the time required in order to complete the fair grounds and buildings for the opening date. As a result the Board of Estimate of the city awarded the contract to a combined bid by Arthur A. Johnson and the Necaro Co., Inc., on a bid of $2,186,185.

Engineering Schools Continue Summer Orientation Courses

Orientation courses for boys in secondary schools who are considering the study of engineering are to be conducted again this summer at Stevens Institute of Technology and at Lafayette College. This will be the sixth year for the Stevens School and the third for Lafayette.

The Stevens Institute course is to be held at the institute's camp at Johnsonburg, N. J., Aug. 16-29, and the Lafayette course is to be held on the college campus, Easton, Pa., June 21-July 4.

The general purpose of these courses is to provide counsel and guidance in engineering for young men who expect to enter college, regardless of whether or not they may wish to study engineering, and to give them a better conception of what is to be required of them in any one of the several branches of engineering which they may plan to follow.

The Stevens course is made up chiefly of lectures by members of the college faculty and visiting engineers, conferences and field work. At Lafayette a similar program is supplemented by work in the college laboratory and by visits to mines and manufacturing plants in the Lehigh Valley.

Alabama Engineers Appointed To Registration Board

Appointments by Gov. Bibb Graves of engineers to serve as members of the Alabama State Board of Registration for Professional Engineers and Land Surveyors include the following: J. A. C. Callan, Auburn, 5 years; J. M. Gallalee, Tuscaloosa, 4 years; J. B. Converse, Mobile, 3 years; R. A. Polglaze, Birmingham, 2 years and A. C. Polk, Birmingham, 1 year. The new registration law conforms closely to the model law prepared by a joint committee of the national engineering societies.

SOCIETY CALENDAR

AMERICAN SOCIETY OF MECHANICAL ENGINEERS, semi-annual meeting, Dallas, Tex., June 15-20.

INTERNATIONAL CONFERENCE ON SOIL MECHANICS AND FOUNDATION ENGINEERING, Cambridge, Mass., June 22-26, 1936.

SOCIETY FOR PROMOTION OF ENGINEERING EDUCATION, annual meeting, Madison, Wis., June 23-26.

HIGHWAY SAFETY CONFERENCE, Ames, Iowa, June 29-July 2.

AMERICAN SOCIETY FOR TESTING MATERIALS, annual meeting, Atlantic City, N. J., June 29 to July 3.

CANADIAN GOOD ROADS ASSOCIATION, annual meeting, Charlottetown, P.E.I., September 1-3.

THIRD WORLD POWER CONFERENCE, Washington, D. C., September 7-12.

PUBLIC WORKS CONGRESS, joint meeting, AMERICAN SOCIETY OF MUNICIPAL ENGINEERS AND INTERNATIONAL ASSOCIATION OF PUBLIC WORKS OFFICIALS, Toronto, Ont., September 28-30.

ILLINOIS ASSOCIATION OF SANITARY DISTRICTS, annual meeting, Urbana, Ill., June 11-12.

NEW YORK STATE SEWAGE WORKS ASSOCIATION, spring meeting, Long Beach, Long Island, June 11-13.

PENNSYLVANIA SEWAGE WORKS ASSOCIATION, annual conference, State College, Pa., June 24-26.

NEW ENGLAND WATER WORKS ASSOCIATION, annual outing, North Scituate Beach, Mass., June 25.

ST. JOHN BRANCH, ENGINEERING INSTITUTE OF CANADA at its annual meeting elected the following officers: president, J. R. FREEMAN; vice-president, E. H. THURBER; secretary-treasurer, F. A. PATRIQUEN.

EXAMINATIONS for registration as Engineers, Land Surveyors and Architects will be held as follows:

MICHIGAN—Examinations for engineers and land surveyors at University of Michigan, Michigan State College, Michigan College of Mines, and at Ironwood; for Architects, at University of Michigan, June 18-20.

NEW YORK—Examinations for engineers at Albany, New York, Syracuse and Buffalo, June 22-24.

THE NORTH AND SOUTH CAROLINA SECTIONS, ASSOCIATED GENERAL CONTRACTORS OF AMERICA, and SOUTH CAROLINA SOCIETY OF ENGINEERS, joint summer meeting, Myrtle Beach, S. C., July 10-11.

Personal

H. M. BAILEY, town engineer, Melville, Sask., has resigned that position to accept the appointment as city engineer at Yorkton, Sask.

LEON MCDONALD of Little Rock, Ark., has been named as assistant state sanitary engineer. He will assist M. Z. Bair, state sanitary engineer.

NEWTON J. KERR, land agent of the Canadian Pacific Ry. since 1915, has resigned. For many years prior to his joining the C. P. R., Mr. Kerr was city engineer of Ottawa, Ont.

ELDRIDGE B. BROWNSON has been appointed a junior patent examiner in the U. S. Patent Office, Washington, D. C. Mr. Brownson is a graduate of Rensselaer Polytechnic Institute. Before his appointment he was a junior engineering aide with the Connecticut state highway department.

C. W. KLASSEN has been appointed chief sanitary engineer of the Illinois Department of Public Health. He automatically becomes technical secretary of the Illinois Sanitary Water Board. He has been acting in both positions since Jan. 17, 1935. Mr. Klassen has been associated with the Department of Public Health since 1925.

SAMUEL B. MORRIS, formerly chief engineer of the Pasadena, Calif., municipal water department, and builder of Morris Dam, has been appointed dean of the Stanford University School of Engineering at Palo Alto, Calif. Mr. Morris recently resigned as head of the Pasadena water department to join the engineering school at Stanford University. Mr. Morris succeeds Theodore Hoover, who is retiring in June.

JAMES F. SANBORN, consulting engineer, New York, has resigned from the position of water consultant to the National Resources Committee. In the survey of stream improvement being carried out by the Water Committee of the National Resources Committee, Mr. Sanborn had been in charge of the streams in the New York, New Jersey and Pennsylvania area to the western boundary of the Susquehanna drainage, as noted in this column several months ago.

G. E. WRIGHT, for the past six years associated with the A. J. Foots Engineering Corp., Larchmont, N. Y., has been appointed as superintendent of public works and superintendent of waterworks for the city of Corning, N. Y. Prior to his work with the Foots company, Mr. Wright had been superintendent of construction for D. F. MacNamee & Co., New Rochelle, N. Y.; engineer and superintendent for Trenor Land Co.; assistant city engineer, Gloversville, N. Y.

JOHN L. NAGLE, assistant chief engineer of the eastern division of the National Park Service, has been assigned to take charge of construction of the $30,000,000 Thomas Jefferson Memorial in St. Louis. Mr. Nagle was in charge of construction of the Arlington Memorial Bridge in Washington, D. C., several years ago and transferred to the National Park Service when that agency absorbed the Office of Public Buildings and Public Parks. His present duties will be taken over by Oliver G. Taylor, deputy chief engineer in charge of the

eastern division of the park service. The St. Louis project, financed in part by PWA, will convert a large area on the riverfront, now a manufacturing and warehouse district, into a park.

CHARLES YOUNG DIXON, engineer in the Detroit District, U. S. Engineer Corps, retired from active duty on May 31, 1936, after over 44 years in the department. Mr. Dixon was born in Niles, Mich., and graduated from the engineering department of the University of Michigan in 1887. He entered the U. S. Engineer Office at Sault Ste. Marie in 1892. Since 1913 he has been in the Detroit district office in charge of river and harbor improvements from the head of St. Marys River, Michigan, to Marblehead, Ohio. Mr. Dixon was president of the Detroit Engineering Society in 1918.

Obituary

FRED S. MATHEWSON, general building contractor of Buffalo, N. Y., died June 5, at the age of 73.

BURTON P. FLEMING, chief engineer of the United States Soil Conservation Service for Utah, Colorado, Arizona and New Mexico, died May 26 at Glendale, Calif., at the age of 55.

A. KARLEN, assistant administrative officer of the U. S. engineers' office in Huntington, W. Va., died May 25. Mr. Karlen had been with the U. S. Engineer Corps for fourteen years.

ROBINSON L. DORING, engineer and construction superintendent, died at Bowling Green, Fla., May 27, at the age of 72. Mr. Doring was a graduate, in civil engineering, of Dartmouth College. He specialized in hydro-electric power plant and paper mill structures.

HARVEY C. HOFFMAN, retired engineer of Huntington, W. Va. died June 5, at the age of 66. For eighteen years Mr. Hoffman was attached to the U. S. Engineer Corps. Subsequently he was a member of the engineering force of the West Virginia road commission, from which he retired three years ago.

GODFREY ENGEL, SR., chief engineer in charge of design and construction for the American Sugar Refining Co., died May 29 in Glens Falls, N. Y. Mr. Engel has, in the past, served on the engineering forces of the Hersey Cane Co., and the Buffalo Foundry & Machine Co.

CONSTRUCTION STATISTICS FOR THE WEEK

ENGINEERING construction volume for the week totals $35,626,000 which is lower than last week. This total is made up of private work at $11,297,000 and public work at $24,329,000, of which $20,465,000 is state and municipal and $3,864,000 is federal. The corresponding values for a year ago are: total, $26,285,000; private, $12,961,000; public, $13,324,000; federal, $2,435,000; state and municipal, $10,889,000.

All classifications with the exception of earthwork, irrigation, drainage and waterways are lower than last week. The classified totals are: public buildings, $3,877,000; commercial buildings, $4,578,000; industrial buildings, $5,041,000; streets and roads, $10,387,000; bridges, $2,769,000; sewerage, $1,235,000; waterworks, $574,000; earthwork, irrigation, drainage and waterways, $4,283,000; unclassified, $2,882,000.

The larger awards for the week include: steam power plant, Commonwealth Edison Co., Chicago, Ill., $3,000,000; banking and mercantile building, Homeland Investment Co., Durham, N. C., $900,000; Cook County, Chicago, Ill., $1,367,000; repair and improvement, 85.1 mi. highways and bridges in Luzerne County, day labor, Wilkes-Barre, Pa., $722,000; paving portions of 26th and 14th Sts., day labor, Minneapolis, Minn., $2,000,000; dredging Conemough River, cleaning Sam's Run, dredging and cleaning Cheney's Run, day labor, Johnstown, Pa., $577,000; emergency gates in 4 tunnels Fort Peck Dam, Fort Peck, Mont., $1,094,000; grading, Chicago, Burlington & Quincy R.R., Chariton, Iowa, $1,000,000; grading 5 mi. second track, Chicago, Burlington & Quincy RR., Lucas, Iowa, $500,000. State and municipal bond sales for construction total $13,642,000 for the week.

CONTRACTS
(Thousands of Dollars)

	Weekly Average June 1935	Prev. 4 Weeks	Week June 11 1936
Federal Government	$6,704	$2,919	$3,864
State and Municipal	11,161	22,746	20,465
Total public	$17,865	$25,665	$24,329
Total private	9,675	10,609	11,297
Week's total	$27,540	$36,274	$35,626
Cumulative to date:			
1935..$593,067,000	1936..$1,016,389,000		

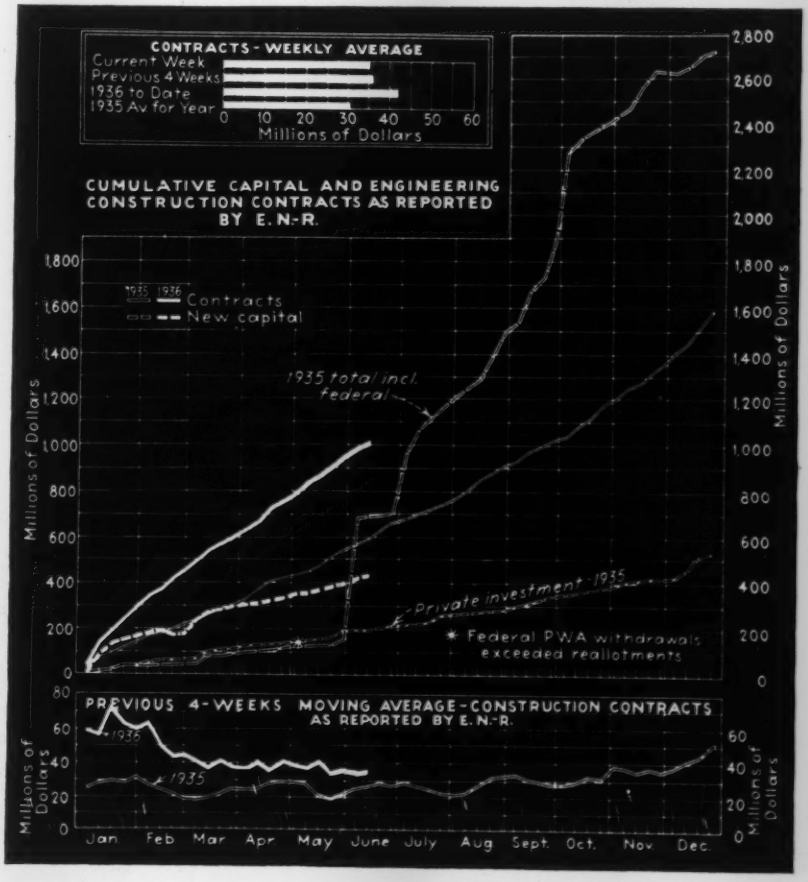
NEW PRODUCTIVE CAPITAL
(Thousands of Dollars)

1936	Week June 11	Cumulative
State and municipal	$13,642	$259,111
PWA non-federal	....	36,183
RFC loans	....	12,008
Corporate issues	....	117,350
PWA loans, Private	1,537	3,270
Total Non-Federal	$15,179	$427,922
Federal	....	4,955
Total new capital	$15,179	$432,877
Cumulative to date:		
1935...$675,207,000	1936...$432,877,000	

Note: These figures include private bonds, and stocks sold for productive purposes; state and municipal bonds for construction; PWA loans and grants to states and municipalities, including the special highway funds; PWA private loans, and allotments for federal construction, deficiency act funds.

INDEX NUMBER

ENR Cost	1913 = 100	1926 = 100	ENR Volume	1913 = 100	1926 = 100
June, 1936	204.10	93.35	May, 1936	149	65
May, 1936	203.40	97.77	Apr., 1936	166	73
June, 1935	194.78	93.63	May, 1935	130	57
1935 (Av.)	195.22	93.84	1935 (Av.)	135	58
1934 (Av.)	198.10	95.23	1934 (Av.)	114	50
1933 (Av.)	170.18	81.80	1933 (Av.)	102	47


CONTRACTS - WEEKLY AVERAGE
Current Week
Previous 4 Weeks
1936 to Date
1935 Av for Year
0 10 20 30 40 50 60
Millions of Dollars
CUMULATIVE CAPITAL AND ENGINEERING CONSTRUCTION CONTRACTS AS REPORTED BY E.N.-R.
1935 1936
Contracts
New capital
1935 total incl. federal
Private investment 1935
* Federal PWA withdrawals exceeded reallotments
Millions of Dollars
PREVIOUS 4-WEEKS MOVING AVERAGE - CONSTRUCTION CONTRACTS AS REPORTED BY E.N.-R.
1936
1935
Jan Feb Mar Apr May June July Aug Sept Oct Nov Dec

Construction Equipment and Materials

New Waterproofing Material

The Mitchell-Rand Manufacturing Corporation of New York City have recently developed a new waterproofing and dampproofing material, Rubberseal Copper. This product consists of Anaconda copper from 2 to 7 oz. in weight, coated on both sides with a special acid and alkali resisting compound. The resulting product is said to be exceptionally flexible, remaining so at freezing temperatures, and to be unaffected by heat, moisture or dryness.

It is claimed that this material will bond itself to any dry surface thus eliminating the need of nailing or other method of attaching. Even when it is necessary to drive nails through Rubberseal Copper, it is claimed that the rubberseal compound will close in around the nail, stopping the passage of air currents or water.

The material has been used for window-head flashings and roofing.

Automatic Operator for Waterworks

International Filter Co., of Chicago, has introduced the Robotrol, a robot operator for automatic filter or softener plants, which performs the entire series of operating functions automatically and times them accurately. It is said to increase efficiency by minimizing the human element in filter or softener operation, and to promote economy by making all operations uniform. The operator merely selects the program, depresses a push button, and goes about other duties, whereupon the Robotrol manipulates the hydraulic operating valves, opening and closing them in proper sequence to, for instance, backwash, rewash, and return the filter to service, all without supervision. There are four push buttons which initiate all Robotrol operations, and these are interlocked and claimed to be foolproof.

Portable Pipe Fitting Machine

The American Die and Tool Company converted one of their Red-E-Haul pipe fitters machines into a trailer that may be moved about like a wheelbarrow and, also, attached to the rear of an automobile as a trailer. With this rig, the machine, it is claimed, can be taken anywhere, even over hardwood floors without injury to them.

Electric Driven Compressor

The Ingersoll-Rand Co. are building a portable compressor with electric drive. The compressor unit is of the two-stage air-cooled type first introduced by Ingersoll-Rand three years ago. The motor is furnished in a.c. and d.c. types, provided with push button magnetic starting and full overload protection. The unit is built in sizes from 60 to 315 cubic feet of air per minute.

New Equipment in Brief

Vest-Pocket Slide Rule: A slide rule with 6 in. scale mounted on a 2¾ in. disc is offered by the Tavella Sales Co., 25 West Broadway, New York City. The rule contains all the standard scales and is claimed to be washable and unbreakable.

First Aid Kit. A first-aid kit, weighing only 10 oz., and measuring 4 in. by 3 in. by 2 in. and which may be carried on the belt or in the pocket, is made by the E. D. Bullard Co., San Francisco, Calif. The kit contains complete first-aid treatments for snake-bites and common injuries, and an assortment of dressings and treatments most frequently required. All units in the snake-bite kit and first-aid kit are unbreakable, and an antiseptic is supplied in a break-proof container.

Business Notes

UNION IRON WORKS, INC., have appointed the following new agents: Cameron & Barkley Co., Jacksonville, Fla.; Intermountain Equipment Co., Boise, Idaho; Parker Danner Co., Boston, Mass.

CHARLES BRUNING COMPANY, INC., have established a new branch at Kansas City, Mo. Norman B. McKinnon will be manager of the Kansas City branch.

THE MARION STEAM SHOVEL CO., Marion, Ohio, is opening an office in San Antonio, Texas. Paul E. Piersol will be in charge.

LINCOLN ELECTRIC CO., Cleveland, Ohio, announces the following changes in its sales personnel: J. S. McKeighan has been transferred to the Dayton, Ohio, sales staff; J. B. McCormick has been transferred from the Philadelphia office, to Fresno, Calif.; P. W. James has been transferred from the factory to Binghamton, N. Y.

CARL W. BAHR, assistant secretary of the National Lumber Manufacturers Association, has resigned that position to become manager of the California Redwood Association, San Francisco.

CRANE-O'FALLON CO. has been appointed representative for the central mountain district by the AMERICAN DISTRICT STEAM CO., North Tonawanda, N. Y.

MACWHYTE COMPANY, Kenosha, Wis., has announced the completion of a new branch and warehouse building at 1603 N. W. Fourteenth Avenue, Portland, Ore.

CUTLER-HAMMER, INC., Milwaukee, Wis., manufacturers of electric control apparatus, announces the opening of a new office in Baltimore at 10 W. Chase St. in charge of R. A. Haworth.

LINK-BELT CO., Chicago, Ill., announces the appointment of Industrial Supplies, Inc., Memphis, Tenn., as authorized stock-carrying distributors of Link-Belt industrial supplies.

KENNEDY VALVE MANUFACTURING CO., Elmira, N. Y., announces the appointment of R. M. Guiry as manager of its Chicago branch office and warehouse.

Water Level Recorder For Laboratory Use

A water level recorder embodying several features designed especially to meet the requirements of hydraulic laboratories, recently was put on the market by Leupold, Volpel & Co., Portland, Ore. The recorder was designed by J. C. Stevens of Portland as an outgrowth of his hydraulic laboratory work. It is known as the **Stevens Type M Recorder.**

The recorder consists essentially of a chart drum turned by an electric clock, a capillary pen moving in practically frictionless guides and supported by a light rod resting on a 3-in. copper float. By the use of interchangeable timing gears, the chart drum may be made to revolve at speeds ranging from once an hour to once in 24 hours, and as the chart is 36 in. long, the time scales range from 36 to 1½ in. per hour. The gage scale is 1 to 1 and the range of water levels is 0.5 ft. although greater ranges may be had.

The recorder is designed primarily for work in hydraulic laboratories or wherever a small range of stage is to be recorded with accuracy.

A special feature of the recorder is the three-piece chart drum consisting of a base turned by the clock, a drum of thin phosphor bronze, and a ring top. The drum is removable for applying the chart and may be adjusted for time by merely turning it on its base. It is held rigid and round by the base and top. Extra drums are available for quick changes.

New Publications

SKF BEARINGS FOR CRANES—SKF Industries, Inc., Philadelphia, Pa., 8x10½, 32 pages.

INDUSTRIAL DUST CONTROL through Exhaust System—by W. O. Vedder, Pangborn Corp., Hagerstown, Md. 5x7, 50 pages.

VORTEX SINGLE STAGE PUMPS—Lawrence Pump & Engine Co., Lawrence, Mass. 9x11, 4 pages.

COLMONOY ALLOYS AND OVERLAY METALS—Colmonoy Co., Los Nietos, Calif. 4x9, 15 pages.

BLAW-KNOX EQUIPMENT FOR INDUSTRIAL PROPORTIONING — Blaw-Knox Co., Pittsburgh, Pa. 8½x11, 8 pages.

THE HOWARD SAFETY WINDOW, Howard Safety Window Co., 2101 W. Purdue St., Milwaukee, Wis. 8½x11, 8 pages.

WHAT EVERY SERVICE STATION OPERATOR SHOULD KNOW ABOUT LIGHTING, Benjamin Electric Mfg. Co., Des Plaines, Ill. 8½x11, 34 pages.

BUYERS GUIDE TO WAREHOUSE STOCKS OF NICKEL ALLOY STEELS, International Nickel Co., New York City. 8x11, 20 pages.

KLOCKNER STEEL SHEET PILING, Coast-to-Coast Steel and Equipment Corporation, New York City. 8x11, 24 pages.

Current Construction Unit Prices

New Mexico Highway Prices, 1935

SIXTY-NINE items of highway construction involving a total cost of $3,435,000 for work performed on New Mexico state highways during 1935 are presented in the following tabulation to show the average contract unit bids for the various classifications. The quantities for each item are also indicated in the comparison as furnished by the New Mexico state highway department, under the supervision of state highway engineer G. F. Conroy, and office engineer R. W. Bennett.

AVERAGE CONTRACT PRICES, NEW MEXICO HIGHWAYS, 1935

1.	Excavation, misc.—3,653,987 cu.yd.	$0.27
2.	Excavation, channel, misc.—28,940 cu.yd.	.19
3.	Structure excavation—27,142 cu.yd.	1.19
4.	Excavation, pipe culvert—8,648 cu.yd.	1.09
5.	Common borrow—289,603 cu.yd.	.17
6.	Sel. borrow—3,971 cu.yd.	.16
7.	Overhaul—4,968,314 sta.yd.	.021
8.	Haul—1,497,479—½ mi.yd.	.056
9.	Cr. grav. surf. course—20,854 ton	.86
10.	Cr. rock surf. course—16,680 ton	1.79
11.	Cr. sel. mat. surf. course—83,549 ton	.87
12.	Base course surfacing—147,415 ton	.64
13.	One course surfacing—40,068 ton	.95
14.	Two course surfacing—730,353 ton	.73
15.	Top course surfacing—52,743 ton	.88
16.	Untreated timber—13,138 M.B.M.	108.20
17.	Concrete, bridge, culvert, syphon—15,952 cy.yd.	20.64
18.	Concrete, metal pipe headwalls—879 cu.yd.	21.07
19.	Reinf. steel, box culverts, syph.—2,003,228 lb.	.053
20.	Rein. steel, pipe headwalls—16,267 lb.	.055
21.	Mortar rubble masonry—464 cu.yd.	13.47
22.	Corr. metal pipe culvert, 24 in.—13,526 lin.ft.	2.70
23.	Corr. metal pipe culvert, 30 in.—6,572 lin.ft.	3.41
24.	Corr. metal pipe culvert, 36 in.—4,836 lin.ft.	5.28
25.	Riprap—2,018 cu.yd.	2.47
26.	Conc. blank bank protection—1,349 sq.yd.	3.97
27.	Cattle guard, 24 ft.—13, each	638.46
28.	Cattle guard, 14 ft.—11, each	420.91
29.	Cattle guard, 9 ft.—6, each	304.17
30.	Concrete monument, marker—54, each	27.98
31.	Galv. barb wire fence—2,368,856 lin.ft.	.06
32.	Gates, Texas type—562, each	3.73
33.	Gates, standard—38, each	15.16
39.	Bracing—3,229 each	1.47
40.	Woven wire farm fence—56,663 lin.ft.	.14
41.	Dry rabble masonry—113 cu.yd.	7.00
42.	Wire cable guard rail—12,780 lin.ft.	.85
43.	Wire cable guard rail—138, each	13.08
44.	Right of way markers—2,960, each	2.76
45.	Rounding slopes—45,396 mile	153.82
46.	Cover material—5,278 cu.yd.	1.90
47.	Pit run gravel base—540 cu.yd.	2.32
48.	Scr. gravel surf. course—2,744 cu.yd.	1.00
49.	Watering base course—11,103 M. gal.	2.40
50.	Rolling—3,872 hour	2.46
51.	Prepare base course—46,331 mile	96.60
52.	Rock asphalt—12,007 ton	9.54
53.	Remove, rebuild fence—34,709 lin.ft.	.037
54.	Obliterate old road—15.305 mile	140.00
55.	Mix oil and aggregate—43.040 mile	554.57
56.	Seal coating—19.658 mile	113.08
57.	Addt'l shoulder surface mat.—11,249 ton	.84
58.	Flex. steel guard fence, type A—10,070 lin.ft.	1.16
	Bridges	
59.	Structure excavation—12,511 cu.yd.	1.65
60.	Concrete, Cl. A, substruct.—5,234 cu.yd.	18.78
61.	Concrete, Cl. A, superstruct.—1,546 cu.yd.	20.55
62.	Tr. br. timber-superstruct.—205.869 M.B.M.	130.21
63.	Tr. br. timber-substruct.—72.741 M.B.M.	130.63
64.	Tr. timber piling—9,590 lin.ft.	1.21
65.	Reinforcing steel—876,916 lb.	.048
66.	Structural steel—2,063,328 lb.	.055
67.	St. chan. br. rail—1,332 lin.ft.	1.40
68.	Untreated timber, substructure—8.769 M.B.M.	79.85
69.	Untreated timber, superstructure—47.733 M.B.M.	80.14

Upper Des Plaines Intercepting Sewer

THE Sanitary District of Chicago, Wm. H. Trinkhaus, acting chief engineer, awarded contract May 7, 1936, for the construction of the upper Des Plaines intercepting sewer located in the villages of Forest Park, River Forest, and Elmwood Park, Ill. The construction is scheduled for 500 days completion and consists of building in tunnel, at a depth of 25 to 35 ft., 8,050 lin. ft. of concrete sewer, 8 ft. 4¾ in. x 10 ft. 6 in.; 2,600 lin. ft. concrete sewer, 8 ft. 4¾ in. x 10 ft. 6 in.; 6,500 lin. ft. concrete sewer, 8 x 10 ft.; 1,145 lin. ft. concrete sewer, 5½ x 6 ft. 10½ in.; 60 lin. ft. concrete sewer, 4 x 5 ft.; and all appurtenant miscellaneous work including excavation, lining, bracing, disposal of water, furnishing and placing concrete, reinforcing steel and iron castings, backfilling and disposal of excess material. The project is financed through PWA funds with a 30-hr. maximum week, and minimum hourly wages of $1.20 to $1.825 for skilled labor and 82½c. for common labor.

The unit bids and totals of the three low bidders, with quantities are listed in accompanying tabulation. (A) S. A. Healy Co., Chicago (contract), $1,259,710; (B) John Marsch Inc., Chicago, $1,279,300; (C) Michael Pontarelli Inc., Chicago, $1,350,830.

UPPER DES PLAINES INTERCEPTING SEWER

Item	Description	Unit Bids A	B	C
1.	Sewer, 8 ft. 4¾ in. dia.—8,050 lin.ft.	$65.50	$67.00	$70.00
2.	Sewer, 8 ft. 4¾ in. dia.—2,600 lin.ft.	70.00	80.00	72.00
3	Sewer, 8 ft. dia.—6,500 lin.ft.	64.00	62.00	69.00
4.	Sewer, 5 ft. 6 in. dia.—1,145 lin.ft.	37.00	38.00	46.00
5.	Sewer, 4 ft. dia.—60 lin.ft.	37.00	38.00	36.00
6.	Sewer Crossing, Chicago Ave.—total	3,000	5,000	4,500
7.	Standard manhole—600 lin.ft.	20.00	15.00	20.00
8.	Reinforcing steel—2,000,000 lb.	.028	.025	.03
9.	Iron castings, misc. metals—20,000 lb.	.10	.10	.10
10.	Concrete bulkheads—10 cu.yd.	30.00	30.00	25.00
11.	Remove concrete bulkheads—10 cu.yd.	50.00	30.00	25.00
12.	Timber bulkheads—3 M.B.M.	100.00	170.00	200.00
13.	Remove timber bulkheads—3 M.B.M.	50.00	50.00	200.00
14.	Rock excavation—500 cu.yd.	5.00	5.00	5.00
15.	Addt'l earth excav. tunnel—200 cu.yd.	4.00	4.00	4.00
16	Addt'l earth excav. open cut—200 cu.yd.	1.50	1.50	1.50
17.	Addt'l concrete, Cl. A, tunnel—200 cu.yd.	12.00	12.00	12.00
18.	Addt'l concrete, Cl. A, open cut—200 cu.yd.	10.00	10.00	10.00
19.	Addt'l concrete, Cl. B—200 cu.yd.	8.00	8.00	8.00
20.	Field office—one	6,000	6,300	7,000

Nevada State Highways

SIX contracts awarded April 15, 1936, reveal the range of highway construction costs for bridge and underpass structures, crushed gravel, stone and asphalt surfacing on Nevada state highways. The work involves two underpasses and bridges, 0.31 and 0.254 miles in length, 3.124 miles of crushed gravel or stone surfacing and 57.32 miles of asphalt surfacing, under the supervision of state highway engineer Robt. A. Allen. The following tabulations list the quantities, unit prices and totals of the three low bidders for each of the six subdivisions of the work.

LOW BIDDERS AND TOTAL CONTRACT PRICES

I. Underpass and bridge—0.31 miles
Wells-Alameda Ave., Reno.
A—J. F. Knapp, Oakland, Cal. (contract) $153,352
B—I. Christenson, Reno, Nev. 161,397
C—Geo. French, Jr., Stockton, Cal. 163,892

II. Underpass and Bridge—0.254 miles
West Second St., near Reno
D—J. F. Knapp, Oakland, Cal. (contract) ..... $ 92,497
E—Geo. French, Jr., Stockton, Cal. 92,606
F—Isbell Const. Co., Reno, Nev. 98,168

III. Gravel highway—3.124 miles
Tonopah, Route 4
G—Dodge Construction, Inc., Fallon, Nev. (contract) $7,410
H—U. B. Lee, San Leandro, Cal. 8,746

IV. Asphalt highway—12.246 miles
Alamo—Crystal Springs, Route 7
J—Geo. French, Jr., Stockton, Cal. (contract) $21,173
K—U. B. Lee, San Leandro, Cal. 21,159
L—J. A. Casson, Hayward, Cal. 22,956

V. Asphalt highway—24.211 miles
Springdale—Stonewall Pass, Route 5
M—Geo. French, Jr., Stockton, Cal. (contract) $32,842
N—J. A. Casson, Hayward, Cal. 34,623
O—J. C. Compton, McMinnville, Ore. 35,038

VI. Asphalt highway—20.862 miles
Coaldale-Rhodes, Route 3
P—U. B. Lee, San Leandro, Cal. (contract) $27,281
R—Dodge Construction, Inc., Fallon, Nev. 27,803
S—Clyde W. Wood, Stockton, Cal. 28,912

UNIT BID PRICES, NEVADA HIGHWAYS

I—Underpass and Bridge—Wells-Alameda Ave.

Item	A	B	C
1. Remove curb & gutter—402 lin.ft.	$0.15	$0.25	$1.00
2. Remove bridge—total	5,000	4,800	4,500
3. Remove paving—8,458 sq.ft.	.05	.10	.15
4. Roadway excavation—26,446 cu.yd.	.50	.60	.70
5. Select borrow—1,224 cu.yd.	.75	.50	.60
6. Structure excavation—2,335 cu.yd.	3.50	3.00	5.00
7. Subgrade—5,031 sq.yd.	.20	.03	.08
8. Finish roadway—0.31 mile	500.00	800.00	800.00
9. Crushed gravel, stone surface—1,320 sq.yd.	1.50	1.30	1.50
10. Crushed gravel, stone foot paths—242 cu.yd.	2.00	1.75	2.00
11. Asphalt road material, SC2—39 ton	20.00	22.00	16.20
12. Asphalt road material, MC2—3 ton	40.00	30.00	50.00
13. Emulsified asphalt penetration—2 ton	40.00	30.00	60.00
14. Roadmix—5,031 sq.yd.	.10	.07	.10
15. Pavement patches—11,225 sq.ft.	.12	.20	.10
16. Concrete, cl. A—3,135 cu.yd.	18.00	19.00	18.00
17. Concrete, cl. A, curb, gutter, sdwalk—270 cu.yd.	18.00	15.00	24.00
18. Concrete, cl. D—271 cu.yd.	20.00	22.00	26.00
19. Concrete rail—1,466 lin.ft.	3.00	3.50	3.00
20. Reinforcing steel—330,500 lb.	.045	.05	.0425
21. Structural steel—391,000 lb	.06	.065	.06
22. Corr. metal pipe, 8 in.—70 lin.ft.	1.25	1.00	1.50
23. Corr. metal pipe, 12 in.—104 lin.ft.	1.50	1.35	1.70
24. Perforated underdrain, 8 in.—1,034 lin.ft.	1.25	1.15	1.45
25. Perforated underdrain, 10 in.—118 lin.ft.	1.50	1.20	1.60
26. Castings—2,300 lb.	.12	.16	.11
27. Pipe rail—150 lin.ft.	3.00	1.10	1.50
28. Waterproofing, 3 ply—1,000 sq.ft.	.50	.60	.15
29. Ballast—800 cu.yd.	.90	1.50	1.75
30. Lighting equipment—total	3,000	3,250	2,800
31. Miscellaneous—total	3,000	2,250	1,500

II—Underpass & Bridge—West Second St.

	D	E	F
1. Remove concrete—70 cu.yd.	$3.00	$6.00	$5.00
2. Roadway excavation—20,883 cu.yd.	.60	.90	.50
3. Select borrow—1,080 cu.yd.	.75	.50	.75
4. Structure excavation—450 cu.yd.	2.00	5.00	2.00
5. Finish roadway—0.25 mile	500.00	800.00	300.00
6. Concrete, cl. A—1,680 cu.yd.	18.00	16.00	20.00
7. Reinforcing steel—182,500 lb.	.045	.0425	.05
8. Structural steel—424,000 lb	.0675	.0625	.07
9. Hand laid riprap—110 cu.yd.	6.00	4.00	4.00
10. Monuments—10 each	5.00	3.00	3.50
11. Asphalt waterproofing, 3 ply—11,500 sq.ft.	.25	.12	.29
12. Pumping equipment—total	2,200	1,800	2,500
13. Lighting equipment—total	1,250	1,000	1,500
14. W. I. pipe, 6 in.—200 lin.ft.	2.25	2.00	2.90
15. W. I. pipe, 8 in.—478 lin.ft.	2.75	2.60	3.25
16. Ballast—2,100 cu.yd.	.80	1.25	1.40
17. Castings—2,250 lb.	.12	.11	.09
18. Move bldgs.—total	100.00	100.00	100.00

III—Gravel Surfacing—Tonopah

	G	H
1. Crushed gravel, stone surface—11,400 ton	$3.65	$3.74

IV—Asphalt Surfacing—Alamo-Crystal Springs

	J	K	L
1. Asphalt road material, SC2—902 ton	$15.20	$15.00	$17.15
2. Asphalt road material, MC2—80 ton	23.70	25.00	24.00
3. Roadmix—12.25 mile	400.00	450.00	375.00
4. Finish roadway—12.25 miles	25.00	25.00	50.00
5. Culvert markers—120 each	3.00	2.00	3.00

V—Asphalt Surfacing—Springdale-Stonewall Pass

	M	N	O
1. Asphalt road material, SC2—1,576 ton	$13.20	$14.30	$14.00
2. Asphalt road material, MC2—159 ton	21.70	22.00	23.00
3. Roadmix—24.21 mile	300.00	300.00	350.00
4. Finish roadway—24.21 mile	25.00	25.00	15.00
5. Culvert markers—240 each	3.00	3.00	2.00

VI—Asphalt Surfacing—Coaldale-Rhodes

	P	R	S
1. Asphalt road material, SC2—1,110 ton	$13.50	$14.00	$14.50
2. Asphalt road material, MC2—137 ton	22.00	21.00	22.00
3. Roadmix—20.86 mile	400.00	400.00	400.00
4. Finish roadway—20.86 mile	25.00	25.00	50.00
5. Culvert markers—208 each	2.00	2.50	2.00

North Side Sewage Plant, Chicago

EXTENSION of Chicago's North Side sewage treatment works, division A, located north of Howard Ave. and west of C. & N.W.R.R., in the village of Niles Center, is scheduled for completion in 375 days under terms of contract awarded in May, 1936. The work, under the supervision of the Chicago Sanitary District, William H. Trinkhaus, acting chief engineer, consists of twelve circular final settling tanks 75 ft. inside diameter, and 17 ft. average depth, with revolving mechanism equipped with radial plows; excavation, concrete pipe, appurtenant pipe and valve work, miscellaneous metal work and installation of mechanical, electrical and hydraulic equipment.

Alternate bids were taken on tanks with revolving mechanisms equipped with radial conveyors. The radial plow type with the arms making one tank revolution every 33 min was selected at a saving of $1,166 based on the low bid.

The project is financed through PWA with minimum labor wage rates stipulated at $1.20 to $1.825 for skilled labor, 82½c. for common, and a 30-hr. week.

The following tabulation lists the quantities, unit bid and totals of the three low bidders: (A) Paschen Bros. Construction Co., Chicago (contract) $369,195; (B) W. E. O'Neil Const. Co., Chicago, $376,213; (C) G. Kehl Co., Chicago, $390,227.

EXTENSION OF NORTH SIDE SEWAGE PLANT, CHICAGO

Item	A	B	
1. Remove, replace top soil—total	$3,000	$2,800	$2,785
2. Earth excavation—52,000 cu.yd.	1.00	1.10	
3. Rock excavation—25 cu.yd.	5.00	5.00	5
4. Sand, gravel, broken stone fill—100 cu.yd.	1.55	2.75	5
5. Concrete, Cl. A—1,210 cu.yd.	10.75	7.15	9
6. Concrete, Cl. B—6,325 cu.yd.	15.65	17.00	14
7. Brick masonry—10 cu.yd.	23.00	21.50	25
8. Reinforcing steel—722,000 lb.	.039	.038	
9. Misc. steel, copper bearing steel—112,000 lb	.085	.09	
10. Misc. iron castings—7,000 lb.	.07	.06	
11. Misc. bronze, brass, copper—700 lb.	1.05	1.08	1
12. Galvanizing—27,000 lb.	.02	.02	.02
13. Pipe railing—300 lin.ft.	1.50	1.35	1
14. Floor grating—560 sq.ft.	2.20	1.30	1
15. Misc. woodwork—0.6 M.B.M.	110.00	120.00	250
16. Asphalt coating—1,700 sq.yd.	.52	.27	
17a. Sheet mastic, type A—3,600 sq.ft.	.24	.25	
17b. Sheet mastic, type B—3,600 sq.ft.	.55	.50	
18. Split vitrif. sewer pipe, 6 in.—700 lin.ft.	.60	.77	
19. Split vitrif. sewer pipe, 10-in.—185 lin.ft.	1.40	1.21	1
20. Vitrif. sewer pipe, 8 in.—100 lin.ft.	1.20	.82	
21. Vitrif. sewer pipe, 12 in.—100 lin.ft.	1.60	1.10	1
22. Bell, spigot, c.i. pipe, 12 ft. plus—430,000 lb.	.055	.05	.0
23. Bell, spigot, c.i. pipe, 3 to 12 ft.—106,000 lb.	.066	.063	.0
24. Bell, spigot pipe, to 3 ft., fittings—150,000 lb.	.101	.105	.1
25. Flanged c.i. pipe, 12 ft. plus—1,000 lb.	.077	.075	.0
26. Flanged c.i. pipe, 3 to 12 ft.—6,000 lb.	.103	.10	.1
27. Flanged pipe, to 3 ft. fittings—67,000 lb.	.132	.13	.1
28. Expansion couplings—2,200 lb.	.22	.20	.1
29. Copper bearing steel pipe, to 1 in.—250 lin. ft.	.374	.29	.3
30. Copper bearing steel pipe, 1¼ & 1½ in.—900 lin.ft.	.506	.50	.3
31. Copper bearing steel pipe, 2 in.—260 lin.ft.	.638	.66	.5
32. Copper bearing steel pipe, 2½ & 3 in.—1,500 lin.ft.	1.21	1.05	1.0
33. Copper bearing fittings, to 1 in.—200 each	.275	.29	.2
34. Copper bearing fittings, 1¼ & 1½ in.—425 each	.44	.56	.3
35. Copper bearing fittings, 2 in.—125 each	.627	.73	.6
36. Copper bearing fittings, 2½ & 3 in.—175 each.	1.342	3.15	1.3
37. Copper pipe, 1½ & 2 in.—350 lin.ft.	.748	.86	.7
38. Copper pipe, 2½ in.—2,700 lin.ft.	1.10	1.00	1.1
39. Copper pipe fittings, 1½ & 2 in.—210 each	1.21	1.21	1.1
40. Copper pipe fittings, 2½ in.—120 each	2.00	2.00	2.1
41. Valves, to 1 in.—85 each	4.84	3.50	2.9
42. Valves, 1¼ & 1½ in.—20 each	8.03	3.90	4.1
43. Valves, 2 in.—20 each	4.95	5.00	5.2
44. Valves, 2½ & 3 in.—20 each	17.00	16.50	16.6
45. Gate valves, 12 in., floor stands—12 each	132.00	126.00	115.0
46. Gate valves, 14 in.—24 each	121.00	123.00	115.0
47. Sluice gates, 8 in.—32 each	62.70	91.00	63.2
48. Sluice gates, 30 in. floor stands—12 each	445.50	435.00	368.0
49. Sewage sampling fittings—total	797.50	728.00	707.2
50. Automatic sewage sampler—9 each	396.00	374.00	391.0
51. Sewage sampler pumps—9 each	151.80	162.00	160.0
52. Plate containers, fillet—total	1,000	1,330	795.0
53. Sludge removal mechanism—total	63,384	62,500	61,690
55. Miscellaneous work—total	4,000	3,600	4,567
56. Electrical work—total	880.00	2,183	1,800
57. Alloy elec. conduit, to ¾ in.—400 lin.ft.	.43	.462	.4
58. Alloy elec. conduit, 1 in.—100 lin.ft.	.47	.54	.5
59. Alloy elec. conduit, 1¼ in.—1,290 lin.ft.	.69	.781	.7
60. Alloy elec. conduit, 1½ in.—600 lin.ft.	.79	.858	.8
61. Alloy elec. conduit, 2 in.—100 lin.ft.	1.05	1.21	1.0
62. Galv. elec. conduit, to ¾ in.—100 lin.ft.	.31	.385	.2
63. Galv. elec. conduit, 1 in.—800 lin.ft.	.42	.44	.3
64. Galv. elec. conduit, 1¼ in.—250 lin.ft.	.54	.583	.5
65. Galv. elec. conduit, 1½ in.—100 lin.ft.	.66	.66	.6
66. Galv. elec. conduit, 2 in.—50 lin.ft.	.78	.88	.7
67. Fibre elec. conduit, 2 in.—20 lin.ft.	.39	.55	.4
68. Single conductor, r.c. d.b. No. 14, 600 volt wire—100 lin.ft.	.046	.055	.04
69. Single conductor, r.c. lead covered, No. 14 600 volt wire—900 lin.ft.	.06	.055	.05
70. Single conductor, r.c. l.c. No. 12, 600 volt—500 lin.ft.	.09	.10	.0
71. Single conductor, r.c. No. 10, 600 volt wire—13,320 lin.ft.	.09	.11	.0
72. Single conductor, r.c. l.c. No. 8, 600 volt wire—100 lin.ft.	.154	.165	.1
73. Bare, stranded copper cable, No. 4—750 lin.ft.	.11	.165	.1
74. Copper bus bar, 1x1½ in.—50 lin.ft.	.46	.55	.5
75. Galv. sheetmetal No. 10 U. S. S. ga.—25 lb.	.39	.55	.3
76. Galv. sheetmetal No. 12 U. S. S. ga.—200 lb.	.39	.55	.3
77. Galv. outlet boxes—25 lb.	.92	1.65	1.3
78. Alloy outlet boxes—25 lb.	1.54	1.65	1.7
79. Misc. steel, electrical work—1,000 lb.	.26	.275	.2
80. Misc. castings—1,000 lb.	.46	.473	.4
81. Misc. hardware—10 lb.	2.20	1.65	1.7
82. Air circuit breakers, 50 amp. 2 pole, hand—9 each.	15.40	14.30	13.0
83. Ebony asbestos wood, 1½ in.—40 sq.ft.	7.26	4.95	7.6
84. Ground cones—8 each.	9.24	10.45	10.4
85. Lighting fixtures, 60 watt—12 each	7.48	6.71	7.8
86. Lighting fixtures, 150 watt—8 each	8.25	8.14	8.6
87. Plug receptacles, weatherproof—8 each	7.98	7.92	8.3

CONSTRUCTION REPORTS

WATERWORKS

PROPOSED WORK

Calif., San Francisco—San Francisco Bay Exposition, Inc., plans water supply for World's Exposition site on Yerba Buena Island. Tentative plan provides for pumping station on the Embarcadero with supply line on San Francisco-Oakland Bay bridge to reservoir on Yerba Buena Island, pipe line 10- to 12-in., supply 2,500,000 gal. daily to storage reservoir of approximately 1,400,000 gal. capacity. Consumption at exposition site estimated at 2,500,000 gal. daily. N. A. Eckart, ch. engr., Utilities Comn., 425 Mason St.

Me., Bradley—Town, H. A. Moulton, chn. Bd. Selectmen, Town Hall, plans water supply system. $36,000. **Maturity indefinite.**

Mont., Billings—City making plans booster pump to carry water from reservoir to airport and 5,000 ft. 6 in. c.i. pipe line also 3 hydrants. Black & Veatch, 4706 Bway., Kansas City, Mo., engrs.

Neb., Lincoln and West Lincoln—Cities plan extending watermains from Lincoln to West Lincoln. Est. about $45,000. W.P.A. application approved. A. A. Batson, Lincoln, W.P.A. dist. engr.

N. C., Elm City—Town Bd. Comrs., authorized bond issue of $7,500 for construction of 75,000 gal. elevated steel tank. J. W. Winstead, Elm City, mayor.

N. C., Landis—Town, filed application with P.W.A. for loan and grant to finance construction waterworks and sewerage system in Rowan Co. $173,363. L. A. Comiher, Landis, mayor.

N. C., Leaksville—Town filed application with P.W.A. for loan and grant to finance construction water and sewerage system. $173,363. G. H. Clark, mayor.

N. C., Mount Gilead—Town filed application with P.W.A. for loan and grant to finance construction water filtration plant. $55,300. J. H. Ledbetter, Mt Gilead, mayor.

N. C., Oakboro—Town filed application with P.W.A. for loan and grant to finance construction waterworks and sewerage systems. $50,000. C. L. Austin, Oakboro, mayor.

Tex., Galena Park—City, c/o H. H. Graff, mayor, bond election June 13, incl. $60,000 bonds for waterworks, and $40,000 for sewerage system, incl. 2 water wells, 50,000 gal. reservoir, 100 gal. tank and 27 fire hydrants. Garrett Eng. Co., Box 1726, Houston, engrs. Noted Sept. 10, C.D.—Sept. 12, E.N.-R.

Utah, Blanding—Town plans replacing present wood supply main and distribution system with c.i. pipe. $45,000. Engineer not appointed.

Ont., Sudbury—R. H. Martindale, waterworks Supt., soon takes bids new pumping outfit to supply water for 2 suburban areas, for City, $6,500.

BIDS ASKED

Colo., La Veta—See "Contracts Awarded."

†Fla., Pensacola—Yards & Docks, Navy Dpt., Wash., D. C., taking bids 400 hp. water tube boiler, etc., Spec. 8249; and gas burners at Naval Air Station, Spec. 8196. (Date not set.)

Md., Sharptown—June 19, by Town Comrs., J. L. Cooper, secy., Contr. 2, constructing pumping station building, concrete sidewalks, grading site and concrete venturi pit; Contr. 6, furnishing, installing pumping equipment, piping, electrical work and appurtenances. Bids about May 29, not let. C. Gardner, Salisbury, consult. engr. Noted May 5, C. D.—May 7, E. N.-R.; adv. E. N.-R. June 11.

Minn., Kellogg—June 25, by Village, J. Keenan, clk., furnishing, installing pumping equipment for waterworks system, furnish materials and construct 11x14 ft. brick, hollow tile pump house. Druar & Milinowski, 830 Globe Bldg., St. Paul, engrs.

Miss., Duck Hill—June 18, by Town, waterworks, deep well and pumps, 50,000 gal. elevated steel tank water main, 30,000 gal. concrete septic tank and sewer main. $30,972. J. M. Gilfillan, Lyric Bldg., Birmingham, Ala., engr. Noted Sept. 18, C.D.—Sept. 26, E.N.-R.

†Va., Quantico—June 17, by Yards & Docks, Navy Dpt., Wash., D. C., 4 pressure sand filters, etc., Spec. 8234.

W. Va., Clarksburg—July 6, by Water Bd. at office S. G. Highland, secy. and genl. mgr., furnishing, installing in present pumping station two gas engine driven centrifugal pumping units, one 4 m.g.d. capacity, 350 ft. head and one 4 m.g.d. capacity 35 ft. head, incl. foundations and piping. Fuller & McClintock, 11 Park Pl., New York, engrs.; adv. E. N.-R. June 11.

CONTRACTS AWARDED

Colo., La Veta—Town Council, water distribution system, pipeline from Cucharas River to La Veta, **W.P.A.** labor, $28,000.

Conn., Norwalk—T. F. Foley & Co., general contractors, 81 Day St., South Norwalk, heating and plumbing for water filtration plant, for City, to Fred W. Connolly Co., 67 North Main St., South Norwalk***waterproofing, damproofing and masonry, to Joseph Lasprogato & Co., South Norwalk***structural steel and erecting, to Porcupine Co., Post Rd., Fairfield. Noted May 18, C. D.—May 21, E. N.-R., under "Contracts Awarded."

D. C., Wash.—District Comrs., District Bldg., pumping equipment at McMillian Pumping Station, to Industrial Piping & Eng. Co., Court Sq. Bldg., Baltimore, Md., $141,900. Bids Apr. 23. Noted Apr. 28, C. D.

D. C., Wash—District Comrs., District Bldg., furnishing steel pipe for watermains, to Columbia Foundation Co., 2207 Channing St. N.E., $243,738.

Mass., Needham—Town, Bd. Selectmen, Town Hall, L. C. Hollis, supt. P. Wks., constructing gravel packed well, to Layne Bowler New England Co., Inc., 1136 Statler Bldg., Boston. Bids May 26, awarded May 27. Noted May 11, C. D.—May 14, E. N.-R.

Miss., Nettleton—City, constructing distribution system, elevated tank, pumping station, sewage disposal plant, etc., to A. Blair, Natl. Bank Bldg., Montgomery, Ala., $53,300; deep well and pump for new waterworks system, to Mercer-Runyan Drilling Co., Pensacola, Fla., $2,550. **P.W.A.** Bids May 26.

Neb., Omaha — Metropolitan Utilities Dist., installing pipe, valves and miscellaneous material for a new pumping unit, water pumping station, Florence Sta., to C. Robeck & Co., Omaha, $18,000. **P.W.A.** Bids Apr. 14. Noted Apr. 7, C. D.—Apr. 9, E. N.-R.

Pa., Springboro—Borough Council, constructing waterworks system, incl. well, pump, motor and pump house, watermains, fire hydrants and elevated steel storage tanks, to Gallagher & O'Hara, 1818 Wilson Ave., Youngstown, O. Est. $24,883. Noted May 7, C. D.—Apr. 16, E. N.-R.

Tex., Celeste—City, c/o A. J. Taylor, mayor, drilling water well, to Mark & Meador, Celeste, $9,721. Est. $10,000. **P.W.A.** Noted Dec. 10, C. D.—Nov. 21, E. N.-R.

B. C., Victoria—B. C. Cement Co., Ltd., 305 Government St., constructing reservoir project for plant on Brentwod Arm, Goldfish Lake, in Highland Dist. of Vancouver Island, involving 4 dams, 2,000 ft. tunnel bored, 1¼ mi. pipe laid and 2 trusses erected, to Luney Bros., Ltd., 1712 Douglas St. Est. $60,000.

SEWERAGE AND WASTE DISPOSAL

PROPOSED WORK

Calif., Bakersfield—City authorized J. Holfelder, engr., City Hall, to inspect sewage disposal plants in various cities and to prepare cost estimate for construction of a modern disposal plant here. Noted May 25, 1934, C. D.—May 31, 1934, E. N.-R.

Calif., Sunset Beach—Sunset Beach Sanitary Dist., rejected bids May 18, constructing disposal plant complete, 2 pumping stations complete, 755 ft. 6 in. pipe siphon, 8,298 ft. 4 in. house connections, 16,039 ft. 6- to 12-in. vitr. clay pipe, 4,255 ft. 6 and 8 in. c.i. pipe flexible for ocean outfall, $126,500. P.W.A. project. Noted May 28, C. D.—Jan. 23, E. N.-R.

Me., Hampden—Town, W. G. Kimball, chn. Bd. Selectmen, Town Hall, plans sanitary sewer lines. $50,000. **Maturity indefinite.**

★**N. Y., Buffalo**—Sewer Authority, City Hall, making surveys and designs for sewage treatment plant on Bird Island Pier. Common Council approved location. $4,000,000. Greeley & Hansen, engrs. P.W.A. project. Noted Mar. 6, North Michigan Ave., Chicago, Ill., 3, C. D.—Mar. 5, E. N.-R.

N. J., South River—Mayor and Council announce that Federal Government has approved grant of $180,000 for constructing sewage disposal plant. L. P. Booz, Perth Amboy, engr. Noted Oct. 24, C. D.—Oct. 31, E. N.-R.

N. Y., Ogdensburg—City, City Hall, plans constructing incinerator plant. To exceed $23,000. H. W. Taylor, 9 Park Pl., New York, engr.

N. Y., Pittsford—Village plans sewers and sewage disposal plant, $100,000. Project was temporarily abandoned but has been revived. May build with federal funds or by private bond issue. Noted Jan. 10, C. D.—Jan. 16, E. N.-R.

N. Y., Syracuse — City, G. H. Ballentine, comr. P. Wks., City Hall, plans cleaning and repairing lateral sewers in various city streets. $60,000-$70,000. W.P.A. project. **Maturity soon.** Owner will supervise and purchase materials.

N. Y., Watertown—City plans large sewage disposal plant. **Maturity indefinite.** W. T. Field Eng. Co., Flower Blk., engrs.

N. C., Landis—See "Waterworks."

N. C., Leaksville—See "Waterworks."

N. C., Oakboro—See "Waterworks."

Tex., Galena Park—See "Waterworks."

BIDS ASKED

Calif., Los Angeles—June 24, by Bd. P. Wks., 4,360 lin.ft. house connection sewers, 279,075 sq.ft. resurfacing streets in Centinella Blvd. and Venice Blvd. $54,000. L. Aldrich, City Hall, engr.

Ky., Louisville—June 25, by Comrs. Sewerage, J. H. Durham, chn., 400 Marion E. Taylor Bldg., for Eagan Ave. Sewer, Contr. 95, incl. 25 lin.ft. 48 in., 435 lin.ft. 42 in., 365 lin.ft. 36 in. rein.-con. circular sewer and 229 lin.ft. 27 in. plain concrete circular sewer. W. M. Caye, c/o Comrs. Sewerage, technical engr.

N. Y., Buffalo—June 26, by Buffalo Sewer Authority, D. H. Carriagher, chn., constructing rock tunnel of storm water drain and appurtenances for Bird Avenue Sewer Dist., Div. J, P.W.A. project.

N. Y., New York—July 1, by Dpt. Sanitation, W. F. Carey, comr. Dpt. Sanitation, 125 Worth St., New York, auxiliary mechanical equipment for Wards Island Sewage Treatment Plant, Sect. 4.

N. Y., Yonkers — June 19, by Westchester Sanitary Sewer Comn., County Office Bldg., White Plains, constructing Sect. K, North Yonkers Project, incl. 1,820 lin.ft. 20- to 24-in. c.i. sewer, 2 sewage regulators, pump house with pumping equipment. P.W.A. project. W. W. Young, 148-66 Martine Ave., White Plains, consult. engr.; adv. E. N.-R. June 11.

O., Columbus—June 23, by P. W. Maetzel, city engr., City Hall, constructing storm sewer in Bliss Run Dist., Contr. 66, Part 5, $100,000.

Wis., Milwaukee—July 9, by Sewerage Comn., furnishing 40 ton mechanical stoker and mechanical feed incinerator for sewage screenings, sewage grit, dust, also erection. $40,000. J. L. Ferebee, Milwaukee, ch. engr.

CONTRACTS AWARDED

Conn., New Britain—F. H. McGraw Co., general contractors, 51 East 42nd St., New York, heating in sewage disposal plant, Christian Lane, to General Heating Corp., 297 Asylum St., Hartford, for City***plumbing, to Otto Epstein, Inc., 40 Elm St., Hartford***electrical work, to Billings Electric Co., 27 Gilbert St.***painting, to J. I. Haas, Inc., 149 Montgomery St., Jersey City, N. J.***elevator, to Burwak Elevator Co., 227 Fulton St., New York***marble, to Freeport Marble & Tile Co., 264 Adams St., Dorchester***stone, to Durastone Co., Inc., Saylesville, R. I.***structural steel and iron to New England Iron Wks., Inc., 1351 Dixwell Ave., New Haven***reinforcing steel, to Joseph T. Ryerson & Son, Inc., New York. Noted Apr. 16, C. D.—Apr. 23, E. N.-R., under "Contracts Awarded."

D. C., Wash.—District Comrs., District Bldg., constructing Items 1-9 and 12 to 18, sewage disposal plant, to Industrial Piping & Eng. Co., Court Sq., Baltimore, Md., $168,257; Items 10z, b and 11, to J. W. Cowper Co., Natl. Press Bldg., $22,918. Bids May 8. Noted May 13, C. D.

Section Index

Engineering Structures:
- Bridges and Grade Crossings 409
- Earthwork, Irrigation, Drainage and Waterways 414
- Foreign 419
- Materials and Equipment 416
- Streets and Roads 411
- Sewerage and Waste Disposal 407
- Unclassified 415
- Waterworks 407

Buildings:
- Public 420
- Commercial 422
- Industrial 423

Projects $500,000 and over symbol ★

Reports noted back to former issues are designated as follows:

C.D. Construction Daily

E.N.-R. Engineering News-Record

Federal Government projects symbol †

◆

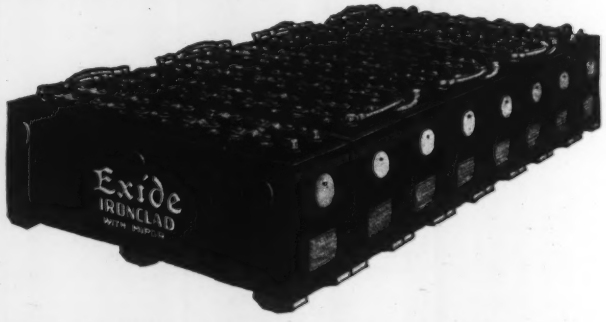
CONSTRUCTION MOVES *FASTER* WITH EXIDE-IRONCLAD BATTERIES ON THE JOB

LOCOMOTIVES and trammers not only work harder and faster, but cost less to operate when powered with Exide-Ironclad Batteries.

Unusual loads and grades are routine work for an Exide-Ironclad. Their tremendous reserve power and sustained voltage pay dividends in extra material hauled per day.

Exide-Ironclads have the four essential battery characteristics for dependable, low-cost haulage—high power ability, high electrical efficiency, extreme ruggedness, and long life. A minimum of maintenance keeps them on the job, while their long, trouble-free service keeps them economical.

Write for free booklet, "The Storage Battery Locomotive for Underground Haulage."



THE ELECTRIC STORAGE BATTERY CO., Philadelphia
The World's Largest Manufacturers of Storage Batteries for Every Purpose
Exide Batteries of Canada, Limited, Toronto

Exide
IRONCLAD
BATTERIES
WITH EXIDE MIPOR SEPARATORS
"MIPOR," Reg. U. S. Pat. Off.

Sewerage, etc. (Continued)

Ill., **Chicago**—Paschen Bros., Inc., general contractors, 910 South Michigan Ave., furnishing 210 tons steel for North Side Sewage Treatment Plant, for Sanitary District of Chicago, 910 South Michigan Ave., to Concrete Eng. Co., 1926 South 52nd Ave.; 140 tons, to O. J. Deegan Inc., Cicero. Noted May 12. C. D.—May 14. E. N.-R., under "Contracts Awarded."

Ill., **Wyanet**—Village, W. D. Young, clk., constructing sewage disposal plant and sanitary sewers in various streets, to J. Morman & Co., Ogilsby. $52,567. P.W.A. Est. about $50,000. Noted May 6. C. D.—May 14. E. N.-R., under "Contracts Awarded."

Minn., **St. Paul**—W. W. Magee, general contractor, 118 West Central Ave., heating, plumbing for 1 and 2 story, 65x115 ft. and 66x46 ft. administration building on Pig's Eye Island, for Minneapolis-St. Paul Sanitary Dist., to Healy Plumbing & Heating Co., 278 West Kellogg Blvd., $18,875; wiring, to Sterling Electric Co., 533 South 5th St., Minneapolis, $5,670. Bids Apr. 20. Noted May 8. C. D.—May 14. E. N.-R., under "Contracts Awarded."

Miss., **Nettleton**—See "Waterworks."

Mo., **St. Louis**—Bd. P. Service, City Hall, furnishing, erecting 2 special drum type magnetic separator units complete with motors and controls for garbage grinder plant No. 2, to Essmueller Mill Furnishing Co., 1220 South 8th St., $4,408; additional separator at later date, $2,204; electrical work for Garbage Grinder Plant 2, to Guarantee Electrical Co., 1407 Olive St., $990; brick work for Plant D, to Seegar & Son, Inc., Railway Exchange Bldg., $2,730; alternate bid for laying precast slab roof and fireproofing roof beams, $3,350. Bids May 22. Noted May 29, C. D.

N. J., **Manville**—Boro. Contr. B. sewage disposal plant and pumping station, to Midland Constr. & Contg. Co., 270 Main St., Hackensack, $90,968. Total est. $350,000 plus. Bids May 6. P.W.A. Noted Apr. 27. C. D.—Apr. 30. E. N.-R.

N. Y., **Buffalo**—Buffalo Sewer Authority, City Hall, Bird Avenue Sewer Dist. and Michigan Ave. Sub-District, Div. G, to E. R. Moorehouse Eng. Co., 1400 Pine St., Camden, N. J., $228,014. P.W.A. Bids May 26. Noted May 28, C. D.—May 14. E. N.-R.

O., **Columbus**—City, installing and constructing sludge digestion tanks and control house, Contr. 15, to Bryant & Detwiler, 2304 Penobscot Bldg., Detroit, Mich., $495,820. P.W.A. Noted May 19. C. D.—May 21, E. N.-R.

O., **Columbus**—City, constructing, installing sanitary sewer in West 5th Ave. Dist., Contr. 41, Part 1, to G. E. Evans, Union Trust Bldg., Warren, $51,766. Est. $60,000. P.W.A. Noted May 20, C. D.

Pa., **Kingston**—See "Streets and Roads."

Tex., **Frisco**—Town, c/o J. M. Ogle, mayor, constructing sanitary sewerage systems, sewage disposal plant, collecting mains, manholes, cleanouts, etc., to McKenzie Constr. Co., Smith-Young Tower, San Antonio, $28,460. Est, $30,000. P.W.A. Noted Dec. 17, C.D.

Wis., **Milwaukee** — Sewerage Comn., general contract constructing sludge conditioning and ferric chloride storage, to A. C. Guetzkow, Inc., 5420 West State St., $64,393. Sub-contracts structural steel, to W. F. Echfeld & Son, 135 East Pittsburg Ave., $4,600***insulation and roofing, to Universal Roofing & Insulating Co., 5402 West State St., $688***sheet metal, to Bauer & Ward, 2210 West Clybourn St., $270***plumbing, to Wenzel & Henoch Co., 1524 North 27th St., $1,190***rolling door, to Wauwatosa Fuel & Supply Co., 7700 Harwood Ave., $706***glazing, to Pittsburg Plate Glass Co., 820 North Market St., $177***gypsum, to U. S. Gypsum Co., 439 West Oregon St., $395***track work, to W. H. Knapp, Inc., 3202 North 27th St., $2,967***plastering, to J. Wartchow, 2950 North 46th St., $194***painting, to T. Chmielewski, 6106 West Orchard St., $495. Grand total $76,075. P.W.A. Noted June 3, C. D.—June 11, E. N.-R.

Wis., **Oconomowoc** — City, equipment for sewage treatment plant, 2 comminutors, to Lakeside Eng. Corp., 223 West Adams St., Chicago, Ill., $2,475***primary clarifier equipment and 2 sludge pumps, to Chain Belt Co., 1600 West Bruce St., Milwaukee, $5,480***chlorinator, to Wallace & Tiernan Co., Inc., 11 Mill St., Belleville, Newark, N. J., $1,517***floating cover for digester, to Pacific Flush Tank Co., 4241 North Ravenswood Ave., Chicago, Ill., $6,470***sewage pump equipment, to Yomans Bros. Co., Chicago, Ill., $2,210***flow meter, to Barley Meter Co., Cleveland, O., $1,050. Grand total $19,202. Noted Feb. 26, C. D.—Mar. 5, E. N.-R.

BRIDGES AND GRADE CROSSINGS

PROPOSED WORK

Arkansas—State Hy. Dpt., Little Rock, plans underpass beneath Rock Island and Missouri Pacific R.R. tracks at West 7th St. crossing, Pulaski Co. $225,000. W. E. Ford, Little Rock, engr.

Ark., North Little Rock—City plans underpass under tracks Rock Island R.R. on 67, changes, in paving, moving several buildings, at Prothos Gin E, of North Little Rock. Est. $80,000. W. E. Ford, Little Rock, engr.

Calif., San Francisco — San Francisco Bay Exposition, Inc., W. P. Day, dir. of works of exposition, Kohl Bldg., making plans concrete, steel structure to connect access drive to exposition site on Yerba Buena Shoals with San Francisco-Oakland Bay Bridge, roadway 64 ft. wide, permitting 6 lanes of traffic, 100 ft. adjoining bridge. Temporary construction will be used for a portion of the structure to be removed after the exposition, the balance to remain as a permanent roadway to the Shoals Airport.

Iowa—State Hy. Comn., Ames, making plans constructing one 320x24 ft. multiple span overhead bridge over C. B. & Q. R.R., incl. 420 cu.yd. Class 1 excav. on secondary road, Lucas Co.; one 424x24 ft. multiple span overhead bridge, incl. 435 cu.yd. Class 1 excav. on U. S. Rd. 65, at M. and St. D. R.R. crossing south of Rockwell, Cerro Gordo Co. F. R. White, ch. engr.

Mich., River Rouge—Great Lakes Steel Co., Tecumseh Rd., Ecorse, plans 200 ft. structural steel tower span, 154 ft. clearance above Rouge River, to carry pipe line across river to Zug Island.

Missouri — State Hy. Dpt., Jefferson City, soon takes bids constructing three 12 ft. rein.-con. slab spans over Eleven Points River; extending two 5 ft. rein.-con. slab spans over Horak Branch, over Dry Branch, Willow Springs North, all foregoing Howell Co.; two 22 ft. spans rein.-con. bridge over Mill Creek, Polk Co.; one 10 ft. rein.-con. slab span over stream on Billings South Rd., Christian Co.; two 8 ft. rein.-con. span bridge over drain Route SD, Route SE, Douglas Co.; three 20 ft. I-beam spans over Lost Creek, Campbell Northwest Rd., Dunklin Co.; two 25 ft. I-beam spans over Drainage Ditch 10, Pemiscot Co.; three 35 ft. span rein.-con. deck girder bridge over Duck Creek, Richland-Route 66 Rd., and one 12 ft. rein.-con. slab span over stream, Taquey to Bloodland, both Pulaski Co.; bridge over Camp Branch, three 10 ft. rein.-con. slab spans over Elk Creek, two 6 ft. concrete slab spans over drain on Elk Creek-Tyrone Rd., Texas Co.; two 6 ft. rein.-con. slab spans over creek, two 6 ft. concrete slab spans over creek, and two 8 ft. rein.-con. slab spans over branch, on Route 61-West, Madison Co.; two 10 ft. rein.-con. slab spans over East Branch Flora Creek, Cape Girardeau North East Rd.; three 33 ft. I-beam spans over Hubbell Creek, Gordonville-West Rd.; three 4 ft. concrete spans over branch; one 10 ft. rein.-con. slab span over drain; one 8 ft. rein.-con. slab span over branch; one 50 ft. I-beam bridge over Whitewater River, all on Shawneetown North Rd., Cape Girardeau Co.; two 10 ft. span rein.-con. slab bridge over Spring Valley; two 6 ft. bridges over drain; two 10 ft. rein.-con. slab spans over Stubbell Field Branch on Many Springs-Myrtle Rd.; three 50 ft. I-beam spans over Hurricane Creek and one 25 ft., one 35 ft. and 30 ft. I-beam span bridge over Piney Creek on Alton New Waverly Rd., Oregon Co.; one rein.-con. slab span over stream on Billings South Rd., Christian Co.; three 17 ft. I-beam spans over County Drainage Ditch on Route 42-Route SD, and two 10 ft. and one 31 ft. I-beam spans over Craven Drainage Ditch, Route 42-Route SD, Butler Co.; two 10 ft. rein.-con. slab span bridge over Boatmans Hollow, Heartville East; three 10 ft. rein.-con. spans over Prairie Hollow, same road; and two 8 ft. rein.-con. slab spans over Dean Hollow, same road, all foregoing Wright Co.; one 12 ft. rein.-con. slab span over stream; one 16 ft. rein.-con. slab span over stream; two 10 ft. rein.-con. slab spans over Walker Creek; four 35 ft. rein.-con. deck girder spans over Castor Creek, all on Van Buren Rd. East, Carter Co.; two 10 ft. and two 12 ft. rein.-con. slab spans over stream on Forsythe West, Taney Co. T. H. Cutler, state hy. engr.

Mo., Kansas City—City, H. F. McElroy, mgr., City Hall, making plans constructing pedestrian underpass at 14th and Washington Sts. $50,000. R. Waddell, city engr.

N. Y., Avoca—Delaware, Lackawanna & Western R.R., G. A. Phillips, ch. engr., Hoboken, N. J., plans eliminating 5 crossings. $200,000. Funds available.

N. Y., Groveland—Delaware, Lackawanna & Western R.R., G. A. Phillips, ch. engr., Hoboken, N. J., town of Groveland and Livingston Co. soon take bids constructing grade crossing elimination at Groveland Crossing. $216,000.

N. Y., Pendleton—Bd. Supervs. Erie Co., Buffalo, making plans constructing steel, concrete bridge over barge canal for Erie and Niagara Counties. Bids in Summer. $50,000.

Texas — State Hy. Comn., H. Hines, chn., Austin, making plans and soon takes bids constructing T. and N. O. R.R. underpass and roadway approaches, on Hy. 29. W.P.G.H. 257-B, Burnet Co.; G. C. and S. Fe R.R. underpass and approaches, on Corinth St., Dallas. W.P.G.S. 953-A, Dallas Co., $45,000; M. K. and T. R.R. underpass and roadway approaches, Hy. 2, W.P.G.M.-113, Hill Co., $100,000; L. A. and T. R.R. underpass and roadway approaches, Hy. 78, W.P.G.M. 905-A, Collin Co.; St. L. F. and T. R.R. underpass and approaches, Hy. "F," W.P.G.S. 863-B, Grayson Co.

Texas—State Hy. Comn., H. Hines, chn., Austin, soon takes bids overpass and roadway approaches 1.9 mi. north of Brownwood, on Hy. 23, WPGS 952-A, Brown Co., $50,000. New P.W.A. project.

★ **B. C., Vancouver** — British Pacific Properties Ltd., 675 West Hastings St., takes bids late this fall for 5,550 ft. 3 spans and approaches suspension bridge with concrete caissons, entrance to Vancouver Harbor. $6,000,000. Robinson & Steinman, 117 Liberty

†*Federal Government*

Constr. News page 409

KOPPEL
Improved
STEEL FORMS
mean lower cost . . . better work . . .

Proved again on the SANITARY DISTRICT of CHICAGO

The Underground Construction Company, Chicago, contractors on the Upper Des Plaines Intercepting Sewer, Contract No. 6, used Koppel forms on this Sanitary District of Chicago project. So satisfactorily did these perform in reducing costs of placing concrete that within a few months they placed a repeat order—and are now using Koppel forms exclusively on this important job. Users everywhere are highly pleased with Koppel results.

Ask them about the unusual features of Koppel designed forms. The forms furnished Underground, for instance, a combination of hand handled and telescopic type design, resulted in time and money-saving in the collapsing, moving and resetting operations and provided an especially smooth finish. Results that were pleasing to the contractor and highly satisfactory to the Sanitary District engineers. Results are not only satisfactory but forming costs, proved on job after job, are lower with Koppel forms.

If you are interested in the ultimate cost of forming on per square foot basis of concrete, write us for details or let Koppel engineers work with you on your form requirements.

Also manufacturers of complete line of cars and a wide range of track equipment that will meet your requirements.

TRADE MARK REGISTERED
KOPPEL
U. S. PATENT OFFICE

KOPPEL INDUSTRIAL CAR & EQUIP. CO.
General Offices: KOPPEL, PA.
NEW YORK • PITTSBURGH • CHICAGO

The Loader to Buy

. . . is a Haiss . . . for its transmission . . . for its feeding device . . . for its ease of operation . . . for the money you save on upkeep.

5 yds. a min.—or 3, 2 or 1½. Let us quote on the size you need.

WRITE, WIRE OR TELEPHONE

HAISS

George Haiss Mfg. Co., Inc., 140th St. & Rider Ave., New York

Who, for over 40 years, have created and sold none but equipment of demonstrable superiority in design and manufacture.

Portable Conveyors—Clamshell Buckets

MAKE *ditching jobs* PAY. . . .

Any ditching job offers an opportunity for better profits when a Buckeye Ditcher does the digging. The most conspicuous savings show up on the mean jobs where the nature of the soil and other adverse conditions make digging difficult. Put a Buckeye on the job, and there will be no delays to waste your time or money. Model 160 fits 75% of all ditching jobs. Other models for all kinds of jobs. Get the facts.

The Buckeye Traction Ditcher Co.
FINDLAY, OHIO

BID THE Buckeye WAY
ask for our operation data before you bid

Buckeye

Bridges, etc. (Continued)

St., New York, N. Y., and Monsarrat & Pratley, Drummond Bldg., consult. engrs. Noted May 5, C. D.—May 7, E. N.-R.

BIDS ASKED

Arkansas—See "Streets and Roads."

Delaware—June 24, by State Hy. Dpt., Dover, bridge, Route K39, Dist. 27, incl. removal of old bridge, Contr. 491, Kent Co.; creosoted timber bridge, Dist. 26, Route 148, Bridge 585, Berryton-Branch, Contr. 492, Kent Co.; creosoted timber bridge Dist. 21, Rd. 24, Mill Creek Dist., 21, Rd. 15, Duck Creek, Kent Co., Contr. 493; structural steel, creosoted timber bridge, Dist. 27, Rd. 131, Bridge 618, Carters Bridge, Choptank Rd., Contr. 494, Sussex Co.; sidewalk Rehoboth Bridge, Contr. 477, Rehoboth. W. W. Mack, Dover, engr.

Kentucky—See "Streets and Roads."

New Jersey — June 22, by E. D. Sterner, comr. State Hy. Dpt., Trenton, constructing highway bridge carrying Route 25, Sect. 22, over tracks Pennsylvania R.R. at Hightstown, Mercer Co., incl. 1,535 cu.yd. foundation excav.; eliminating Lake Ave. and L. V. R.R. grade crossing at Goodmans in Scotch Plains and Clark Twps., Union Co., 3,726 cu.yd. roadway excav. P.W.A. project; adv. E. N.-R., June 11.

N. J., Newark—June 23, at office of Chief Engineer Essex Co. Park Comn., 115 Clifton Ave constructing multiple span rein.-con. slab bridge to support tracks of New York and Greenwood Lake Ry. Co. over and across projected park driveway in Branch Brook Park, Newark. A. B. Cohen, 1 Madison Ave., New York, consult. engr.; adv. E. N.-R., June 11.

New York—July 1, by Dpt. P. Wks., Div. Eng., State Office Bldg., Albany, raising Bridge E-41, Harbor Rd., Herkimer Co.; Bridge E-47, Whitesboro-Marcy Rd.; Bridge E-49, Oriskany Rd., and Bridge E-54, Lawrence St., Rome, all foregoing Oneida Co., Contr. U.S.-12. F. S. Greene, supt. P. Wks.; adv. E. N.-R., June 11.

New York—July 2, by Dpt. P. Wks., Div. Eng., State Office Bldg., Albany, raising guard gate and 6 barge canal bridges, Guard Gate 2, Saratoga Co.; constructing Bridge E5, at Guard Gate 2, Saratoga Co.; Bridge E8, Rexford-Aqueduct, Saratoga and Schenectady Counties; Bridge E11, Freemans, Schenectady Co.; Bridge E27, Mindenville, Montgomery Co.; Bridge E29, Lansing; and Bridge E30, Finck's Basin, both Herkimer Co., Contr. U.S.-13. F. S. Greene, supt. P. Wks.; adv. E. N.-R., June 11.

N. Y., Pendleton—June 18, by Bd. Supervs. Erie and Niagara Counties, County Hall, Buffalo, 134 ft. constructing steel truss highway bridge with concrete abutments over Tonawanda Creek, here.

Pennsylvania—See "Streets and Roads."

South Dakota—See "Streets and Roads."

†Virginia — June 18, by Pub. Rds., Dpt. Agriculture, 1725 F St. N. W., Wash., D. C., constructing Project 1T2, 4 stone and rein.-con. bridges and culverts in Blue Ridge Parkway, Floyd and Patrick Counties, incl. 300 cu.yd. unclassified excav.; 800 cu.yd. unclassified excav. for structures. H. J. Spelman, dist. engr.; adv. E. N.-R., June 11.

Wisconsin—See "Streets and Roads."

CONTRACTS AWARDED

Alabama—See "Streets and Roads."

Arkansas—See "Streets and Roads."

Arkansas—State Hy. Dpt., Little Rock, rein.-con., structural steel railroad underpass, concrete paving, grading, drainage Mansfield-Waldron Rd., Scott Co., to S. E. Evans, Fort Smith, **$78,001** est. $80,000***rein.-con. overpass over Missouri-Pacific R.R., Saline Co., to E. B. Mooney, Hot Springs, **$13,947** est. $40,000*** rein.-con. overpass and rein.-con. bridge, concrete paving on Paragould-Marmaduke Rd., Greene Co., to Luten Bridge Co., Gazette Bldg., Little Rock, **$67,141** est. $60,000. Grand total $159,089. Bids May 27. Noted May 18, C. D. —May 21, E. N.-R.

Calif., San Francisco—Dpt. P. Wks., City Hall, removing steel, rein.-con. span at Beale and Harrison Sts., and modifying existing rein.-con. abutments and constructing new rein.-con. viaduct, to Sibley Grading & Teaming Co., 165 Landers St., **$54,555** est. $55,000. Bids May 6. Noted May 11, C. D.

D. C., Wash.—District Comrs., District Bldg., widening bridge over B. & O. and Pennsylvania R.R., to Bahen & Wright, 916 Rhode Island Ave. N.E., **$166,049.** Noted May 14, C. D.

Fla., Jacksonville—Duval Co., treated timber, concrete bridges over McGirts Creek at Timuquana Rd. and Jacksonville Heights Rd., new bridge over Cedar Creek at 64th St. and new bridge over Fishing Creek at Timuquana Rd., to North American Constr. Co., 11 West Ashley St., **$89,519***treated timber, concrete bridges Nine Mile Creek on Trout River Blvd., across McGirts Creek at Chaffee Rd., across Big Pottsburg Creek on Hogan and Belfort Rds. and across Greenfield Creek on Girvin Rd., to H. R. Goyke & Co., Graham Bldg., **$35,957***concrete culverts, Hamilton Ave., 53rd St. and Cassett Ave., to T. B. Gillespie, Palatka, **$24,502.** Grand total $149,978.

Iowa — State Hy. Comn., Ames, to F. A. Moser, Strawberry Point, 7 rein.-con. culverts in Allamakee Co, **$5,069***to B. Cole & Son, Ames, 144x24 ft. I-beam bridge and 1 rein.-con. culvert in Black Hawk Co., **$19,465***to J. B. Elliott, Independence, 60x24 ft. I-beam bridge in Bremer Co., **$12,280***to E. A. Wickham & Co., Council Bluffs, 180x24 ft. and two 150x24 ft. bridges in Cass and Pottawattamie Counties, **$50,251***to A. M. Cohron, 1007 Army Post Rd., Des Moines, 48x24 ft. bridge in Dallas Co., **$48,863***to L. Peterson, Cedar Rapids, 7 corrugated pipe culverts in Dubuque Co., $16,159***to Jensen Constr. Co., Kimballton, 1 [illegible]x24 ft. bridge in Keokuk Co., **$18,644***to Bolton & Olson, Inc., Sioux City, 160x24 ft. continuous I-beam bridge and 150x20 ft. continuous I-beam bridge in Lyon Co., **$28,770;** 150x20 ft. bridge in Montgomery Co., **$11,873;** 170x24 ft. continuous I-beam overhead bridge in Montgomery Co., **$16,872***to J. H. Hunzinger, Davenport, 134x24 ft. bridge in Marshall Co., $15,2[illegible]*** to G. W. Condon Co., Grain Exchange Bldg., Omaha, Neb., 195x24 ft. bridge, Monroe Co., **$40,990***to Christensen Bros., Sioux City, 14 corrugated metal and 7 rein.-con. pipe culverts and 7 rein.-con. box culverts in Montgomery Co., **$12,419;** 1 rein.-con. box and 1 rein.-con. pipe culverts in Montgomery Co., **$1,380***to Koehler Constr. Co., Lincoln, Neb., main span overhead crossing in Sioux Co., $17,683***to F. O. Akin, Corning, 150x20 ft. continuous I-beam bridge in Taylor Co., **$12,676***to Hildebrand & Kraph, Belmond, 36x77 ft. bridge and 210x20 ft. continuous I-beam bridge in Wright Co., **$36,382.** Grand total $38[illegible]. Bids May 26, awarded June 1. Noted June 2, C. D.

Kansas—State Hy. Comn., at office County Clerk, Anthony (**P. means Project**), 392 ft. bridge, Rt. Sta. 134 plus 02, five 19 ft. timber spans, P. 50S-13-APMH 302-H, Part 2, to C. L. Ring, McPherson, **$5,927***Bridge 0.7, three 35 ft. and two 30 ft. continuous slab spans, P. 8-9-WPGH 452-F, Stafford Co., to L. G. Barcus, Kansas City, **$20,341***Bridge 0.7, five 30 ft., four 50 ft., one 35 ft. and one 30 ft. rein.-con. deck girder spans, P. WPGS 551-A, Harper Co., to Banta Constr. Co., Harper, **$10,636***Bridge 0.8, nine 30 ft., rein.-con. deck girder spans, P. WPGS 551-A, Harper Co., to Geiger & Rutherford Co., Leavenworth, **$23,936.** Grand total $90,840. Bids May 15, C. D.—May 7, E. N.-R., under "Streets and Roads."

Kansas—State Hy. Comn., at office County Clerk, Garnett (**P. means Project**), to Maxwell Constr. Co., Columbus, Bridge 0.4, two 12x12x41 ft. rein.-con. spans, P. 69-3-FA 539-A, Cherokee Co., **$4,341;** Bridge 0.7, two 14x10x18 ft. rein.-con. spans, same road, **$3,311;** Bridge 2.3, seven 26 ft. I-beam span, pile bents, WPSO 1-541-E, Neosho Co., **$10,282***to J. S. Vance & Sons, Parsons, Bridge 1.9, two 14x14x56 ft. rein.-con. spans, **$7,360***to S. B. Murphy, Centralia, Bridge 3.3, three 40 ft. rein.-con. deck girder spans, **$9,073;** Bridge 6, three 45 ft. rein.-con. deck girder spans, **$10,685,** all foregoing on P. 59-15, WPGH 78-A, Anderson Co. Grand total $45,052. Bids May 16. Noted May 4, C. D.—May 7, E. N.-R., under "Streets and Roads." State Roads Comn., at office County Clerk, Garnett, rejected bids May 16, Bridge 1, P. WPSO 541-D, and Bridge 1.1, WPSO 541-D, both Neosho Co.

Kan., Fowler—Owner, (one of major oil companies), c/o Matthews & Kenan, engrs., Smith-Young Tower, San Antonio, Tex., rein.-con. steel pile, steel truss bridge, etc. to support two 20 in. gas lines and walkway, 80 ft. steel truss band with 150 ft. steel pile trestle approach, 230 ft. long, across Crooked Creek, near here, to Pittsburgh-Des Moines Steel Co., 1015 Tuttle St., Des Moines, Ia., to exceed **$150,000.**

Maryland—State Roads Comn., Baltimore, triple span open spandrel concrete arch bridge, Contr. W-174-1-636, **Washington Co.,** to G. F. Hazelwood, Cumberland, **$98,568.** Noted May 27, C. D.

Massachusetts—Commonwealth of Massachusetts, Dpt. P. Wks., W. F. Callahan, comr., G. H. Delano, ch. engr., 100 Nashua St., Boston, grade crossing project in town of Ayer, WPGS, 273, steel pony truss grade crossing bridge with bituminous macadam approaches and bitulithic concrete paving on bridge, to Coleman Bros. Corp., 245 State St., Boston, **$101,845.** Bids May 12, awarded May 28. Noted May 20, C.D.

Minnesota—State Hy. Dpt., St. Paul, constructing Bridge 5058, three span deck girder overhead, State Project 16-9-38, WPGH 331-A, Martin Co., to M. H. Babcock, Winnebago, **$26,993***Bridge 5524, five span overhead, S.P. 17-17-29-1, WPGH 571A, Lyon Co., to E. M. Ganley Co., 2922 Oakland Ave., Minneapolis, **$38,584***Bridge 5441, four span concrete deck girder overhead, S.P. 55-142-24-1B, WPGH 529-F, Stearns Co., to Anderson & Sons, 100 North 7th St., Minneapolis, **$37,915***Bridge 5440, three span concrete deck girder overhead, S.P. 95-95-21-3, WPGH 474D, Washington Co., to L. H. Sault, 551 Gilfillan Block, St. Paul, **$26,691***Bridge 5583, Project 62-23, WPGMS 565A, Ramsey Co., to C. F. Sculley Equipment Co., 519 Guardian Bldg., St. Paul, **$88,842***Bridge 5595, multiple beam span underpass and approaches, Project 62-25, WPGMS 600A, Ramsey Co., to Dunnigan Constr. Co., 606 Minnesota Mutual Life Bldg., St. Paul, **$40,101.** Grand total $259,126. Bids May 22. Noted May 18, C. D.—May 21, E. N.-R.

New Jersey—E. D. Sterner, comr., State Hy. Dpt., Trenton, grade crossing elimination Route S-40 and Central R.R., Woodland Twp., Burlington Co., to S. J. Groves & Sons, Ridgefield, **$52,833.** Noted May 8, C. D.—May 14, E. N.-R.

Constr. News page 410

†Federal Government

Bridges, etc. (Continued)

New Jersey—State Hy. Dpt., Trenton, construction rein.-con. grade crossing elimination over Springfield Ave., Berkeley Heights, to H. I. Harrison & Son, 1060 Broad St., Newark, **$145,892.** General contractor awards contract for 225 tons reinforcing steel, to Igoe Bros., Inc., 234 Poinier Ave., Newark. Noted Apr. 1, C. D.—Apr. 2, E. N.-R.

★ **New York**—A. W. Brandt, comr. Hys., Albany, bridges in Delaware and Otsego Counties, to M. R. Ingraham, Inc., 444 Bway., Albany, **$226,800** est. $251,490***Tioga Co., to E. V. Chappell, 192 West End Ave., Binghamton, **$131,880** est. $146,946***Schuyler and Tompkins Counties, to J. F. Morgan Co., Ithaca, $93,690 est. $98,066***Rockland Co., to T. A. Brozan, 656 Central Park Ave., Yonkers, **$175,087** est. $202,579. Grand total $627,457. Bids May 19. Noted May 25, C. D.—May 7, E. N.-R.

New York—Foley Bros., general contractors, 135 East 42nd St., New York, 55 tons reinforcing bars for bridge over Lehigh Valley R.R. tracks on West Henrietta-Rush Hy., Monroe Co., for Dpt. P. Wks., Albany, to Brewster & Williams, Inc., Dillage Bldg., Syracuse; fabricating steel, to Concrete Steel Co., 207 James St., Syracuse. Noted May 20, C. D.—May 28, E. N.-R., under "Contracts Awarded."

N. Y., Farmersville—Pennsylvania R.R. Co., W. D. Wiggins, acting ch. engr., Broad Street Sta., Phila., Pa., constructing Napier Crossing, to A. K. Van Ingren, Hamburg, **$28,165.**

Pennsylvania—At office P. M. Tebbs, for W. Van Dyke, secy. Hys., Harrisburg, 1,635 ft. steel truss bridge, encased I-beam underpass, rein.-con. paving, rein.-con. gussets, Route 639, Sect. 8, North Huntingdon Twp., Westmoreland Co., to Freeland, Inc., 1 Penn Ave., Pittsburgh, **$177,309.** Bids May 15. Noted May 20, C.D.

South Carolina—State Hy. Dpt., Columbia, 190 ft. bridge and approaches over G. & F. R.R., Project W.P.G.H. 21, Edgefield Co., to Claussen-Lawrence Constr. Co., 1394 Gwinnett St., Augusta, Ga., **$16,081***224 ft. rein.-con., structural steel bridge over A. C. L. R.R., etc., Project W.P.G.H. 22, Charleston Co., to Simons-Mayrant Co., Charleston, **$76,198***90 ft. rein.-con. bridge over B. U. C. R.R., in Union, Route 176, W.P.G.M. 403, Union Co., to F. W. Lamotte, Columbia, **$14,861.** Grand total $107,-140. Bids May 19. Noted May 27, C. D.—May 14, E. N.-R.

Washington—See "Streets and Roads."

Wash., Seattle—City Light, City Light Bldg., contract awarded to Contractors Mchy. & Storage Co., 3219 Utah St., at $40 per ton, to furnish steel in Northwest Traction company's bridge near Bellingham. Contract will total approximately **$13,000.** Bridge to be installed by City Light Crews. Bids to be called for 50.7 tons steel for tower, $3,000. Work also involves 600 ft. 78 in. wood stave or steel water pipe. All work done by City Light crews. Total $70,000. J. D. Ross, City Light Bldg., engr.

Wisconsin—See "Streets and Roads."

STREETS AND ROADS

BIDS ASKED

Arkansas—June 17, by State Hy. Dpt., Little Rock, grading, drainage, gravel base course, bituminous surfacing 0.2 mi. Inter-Sect. 63, and Huntington Ave. East to Floyd St., Craighead Co., incl. 892 cu.yd. common excav., $20,000; 6.1 mi. Inter-Sects. 70 and 270 W.H.S. extends to Ouachita River, Garland Co., 13,073 cu.yd. unclassified excav., $60,000; grading, drainage, burnt shale surfacing 8.9 mi. Inter-Sects. 45 and 10, Hackett East to Hy. 71, Sebastian Co., 42,214 cu.yd. unclassified excav., $80,000; grading, drainage, rein.-con. overpass and concrete pavement 0.22 mi. Bridge St., Craighead Co., 4,430 cu.yd. unclassified excav., $120,000.

Arkansas—June 17, by State Hy. Dpt., Little Rock, grading, drainage, traffic service gravel surfacing 5.4 mi. Dutch Mills-Cane Hill Rd., Washington Co., incl. 2,685 cu.yd. excav., $20,000; 5.8 mi. Hindsville Mail Route, Madison Co., 26,017 cu.yd. unclassified excav., $40,000; grading, drainage, constructing 2 untreated timber bridges and traffic service gravel surfacing 7.8 mi. North Berryville North on County Rd. to Arkansas-Missouri Line, Carroll Co., 16,942 cu.yd. unclassified excav., $40,000; grading, drainage, constructing 1 untreated timber bridge, traffic service gravel surfacing 7.7 mi. E. V. E. Van B. on 64 East on County Rd., to 1.5 mi. Kibler, Crawford Co., 16,589 cu.yd. unclassified excav., $40,000; grading, drainage, constructing six untreated timber bridges, traffic service gravel surfacing 7 mi. Northeast Selma along County Rd. through Winchester East Drew Co., 39,618 cu.yd. common excav., $40,000.

Calif., Sacramento—H. G. Denton, city clk., taking bids 1,000,000 sq.ft. bituminous concrete pavement in various streets.

Delaware—June 24, by State Hy. Dpt., Dover, clearing, grubbing, grading 1.43 mi. Carr Rd., Contr. 495, Kent Co., involving 400 cu.yd. rock excav., etc.; bithulithic concrete on broken stone paving, etc. 0.292 mi. Lake Ave., Milford. Contr. 478, 1,580 cu.yd. unclassified excav.; grading, structures, shaping 3.03 mi. Little Creek-Port Mahon Rd., Contr. 308 B, Kent. W. W. Mack, Dover, engr.; adv. E. N.-R., June 11.

Kentucky — June 26, by State Hy. Comm., Frankfort, high type surfacing 0.683 mi. Main St., Scottsville, WPMH 204-B-S. Allen Co.; grading, draining 3.571 mi. Mexico-Dycusburg Rd., WPSO 398 A-G, Crittenden Co.; 1.818 mi. Clay City-Mt. Sterling Rd., WPSO 436 B-G, Montgomery Co.; 1.888 mi Louisville-Cincinnati Rds., WPMH 194-H-G, Jefferson Co.; bridge and approaches over Pond Creek, Mannslick Rd., RH 1, Jefferson Co.

Maryland—State Roads Comm., Baltimore, rejected bids May 5, macadam paving 1.76 mi. Churchville-Level Rd., Contr. H-198-1-45, Harford Co. Noted May 19, C. D.—Apr. 30, E. N.-R.

Md., Baltimore—June 17, by Bureau Hys., Municipal Bldg., 5,475 sq.yd. sheet asphalt paving, Contr. 668.

Mass., Chelsea—See "Contracts Awarded."

Minn., Minneapolis—See "Contracts Awarded."

★ **Mississippi**—June 17, by E. D. Kenna, dir. State Hy. Dpt., Jackson, grading, drainage, bridging 16.513 mi. Meridian-Electric Mills Hy., PWS Docket 1043-R-9, 107-A and 110, Lauderdale and Kemper Counties, incl. 644,000 cu.yd. common excav., $400,000; 16.419 mi. Woodville-Natchez Hy., PW Docket 1043-R-41, Wilkinson Co., 786,006 cu.yd. common excav., $300,000; 7.867 mi. Grenada Memphis Hy., PWS Docket 1043-R-45, Yalobusha Co., 246,595 cu.yd. common excav., $133,000; 17.953 mi. Lula Tunica Hy., PWS Docket 1043-R-49C, Coahoma and Tunica Counties, 332,000 cu.yd. common excav., $178,000; 10.939 mi. Woodville Natchez Hy., PWS Docket 1043-R-53, Adams Co., 248,000 cu.yd. excav., $180,000; 9.915 mi. Tchula Cruzer Hy., PWS Docket 1043-R-245C, Holmes Co., 466,400 cu.yd. common excav., $240,000. P.W.A. project. H. A. Harris, Jackson, engr.

Mo., Kansas City—See "Contracts Awarded."

New York—June 23, by Dpt. P. Wks., Albany, bituminous macadam paving 5.63 mi. road in Essex Co.; 3.44 mi. Allegany Co.; 9.5 mi. Broome Co.; 6.47 mi. Franklin Co.; 3.28 mi. Madison Co.; 7.14 mi. Montgomery and Schoharie Counties; 3.45 mi. Monroe Co. and 3.8 mi. Westchester Co.; painting bridges in Clinton, Franklin, Lewis and St. Lawrence Counties. F. S. Greene, supt.; adv. E. N.-R., June 11.

N. Y., Buffalo—June 18, by P. Wks. Bd., G. Summers, comr., City Hall, repaving Tremont Pl., Kensington Ave., Amherst, Babcock, Spann, Fredro and Tonawanda Sts.

N. Y., Syracuse—See "Contracts Awarded."

Ohio—J. J. Jaster, Jr., dir. State Hy. Dpt., Columbus, received no bids May 26, grading, drainage structures, traffic bound surface course paving 3.342 mi. Mudsock Lecta Rd., Gallia Co., $20,177; 3.01 mi. Sects. C. and D. County Hy. 256, Portage Co., $12,355; 2.586 mi. Township Rd. 226, WPSO 930A, Tuscarawas Co., $17,438; 3.016 mi. Jerico Rd., County Hy. 33, Defiance Co., $18,580; 1.591 mi. Sect. A, Heywood Rd., County Hy. 24, Erie Co., $9,306; 1.506 mi. Kownig Rd., WPSO Project 966A, Auglaize Co., $10,378; 3.749 mi. New Franklin Lisbon County Rd., Columbiana Co., $19,183; grading 3.334 mi. Buckeye Furnace Rd. A-5, Jackson Co., $16,340; grading, drainage, waterbound macadam paving 1.09 mi. Cable Rd., County Hy. 59, Erie Co., $10,572; drainage structures, grading, concrete paving, constructing concrete bridge with steel beams, Warren Co., $181,373; grading, draining, brick paving, concrete bridge with steel beams, part Broadview Heights Sect., Proposal 1, $223,426; grading, drainage structures, roadside improvement, brick paving 0.141 mi, same road, Proposal 2, $11,674. Noted May 18, C. D.—May 21, E. N.-R.

Oregon—June 26, by State Hy. Dpt. grading, paving, 15 mi. last link of Portland Oregon City 4 lane highway, Multnomah and Clackamas Counties.

Pennsylvania—June 19, at office W. Van Dyke, secy. Hys., Harrisburg, grading, drainage, channel change, reinforcing existing abutments 457 ft. R-21003, Upper Mifflin and North Newton Twps., Cumberland Co., involving 38,256 cu. yd. Class 1, and 178 cu. yd. Class 2 excav.; temporary bridge for Route 69 over the Kiskiminitas River, also approaches on 983 ft. by Oklahoma and Apollo Boroughs, Washington Twp., Armstrong and Westmoreland Counties; erecting pony truss bridge, bituminous on modified crushed aggregate surfacing 300 ft. R-25008, Girard Twp., Erie Co., 2,949 cu. yd. Class 1, and 758 cu. yd. Class 2 excav.; temporary shoring of existing steel truss bridge over Kiskiminitas River, 396 ft. R-228, Sect. 8, Saltsburg Boro, Loyalanna Twp., Indiana and Westmoreland Counties; bituminous on native stone surfacing, I-beam stringer bridge, 1,490 ft. R-33016, R-33017, Beaver Twp., Worthville Boro, Jefferson Co., 5,409 cu yd. Class 1 and 450 cu. yd. Class 2 excav.; rein.-con. bridge, bituminous on native stone or modified crushed aggregate surfacing 825 ft. R-39002, Sect. 1, Lower Milford Twp., Lehigh Co., 788 cu. yd. Class 1, 80 cu. yd. Class 2 and 6,386 cu. yd. borrow excav.

Pa., Kingston—See "Contracts Awarded."

Pa., Wilkes-Barre—See "Contracts Awarded."

†*Federal Government*

Constr. News page 411

Answers to Your SILICOSIS Prevention PROBLEMS

Control Rock Drill Dust with

MARKLEY DUST CONTROL EQUIPMENT

"Collects and Controls"

TROUBLE?
—None at ALL!

Portable units—can be set up and ready for use in few minutes. The exclusive snap-on hood can be attached or detached pronto.

CONVENIENT?
—Certainly!

Powered by its own individual gasoline, air or electric motor.

SAFE?
—Absolutely!

Dust is collected in sturdy dust-tight fiber containers, sealed for convenient removal. An exclusive Markley feature.

EFFECTIVE?
—Very!

Double separation of dust in the exhaust system insures effective and positive collection of all the dust and the discharge of hygienically safe effluent air.

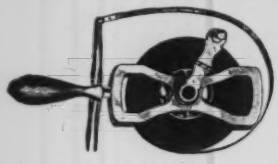
COST?
—You'd be surprised!

Will pay for itself because of increased drilling speed and reduced drill steel sharpening costs, plus low first cost.

Write, wire or phone

Markley Dust Control System, Inc.
Phone: VAnderbilt 3-5675
415 Lexington Avenue,
New York City, N. Y.

LUFKIN
HI-WAY
DRAG TAPES



Designed Especially for Highway, Railroad and Similar Work

A heavy Chain Tape of special tough steel and with extraordinary resistance to wear and tear.

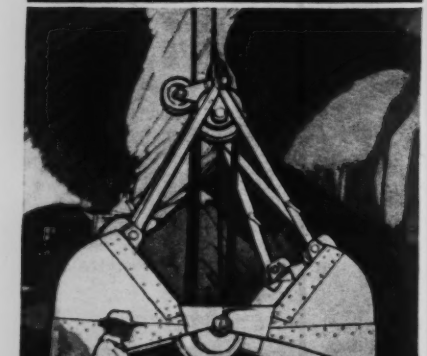
Outwears All Other Chain Tapes

"HI-WAY" Tapes have ½ railroad gage mark at 2'-4¼" from zero.

Send for catalog illustrating and describing the finest and most complete line of Tapes and Rules for all general measuring purposes.

THE LUFKIN RULE CO.
SAGINAW, MICHIGAN, U. S. A.

ROPE-REEVE
POWER-WHEEL
LINK-TYPE
BUCKETS



Capacities: ½ to 15 Yards for All Kinds of Light or Heavy-duty Service.

INDUSTRIAL BROWNHOIST
BAY CITY, MICHIGAN
New York, Philadelphia, Cleveland, Chicago
Agents in principal cities

Streets and Roads (Continued)

Wisconsin—June 16, by State Hy. Comn., Eau Claire, concrete surfacing 6.336 mi. Cadott-Ladysmith Rd., State Trunk Hy. 27, Project 6301, Sect. 3; grading, draining 6.936 mi. same road Sect. 1, 6.744 mi. same road all foregoing Chippewa Co.; 4.56 mi. Pittsville-Neillsville Rd. and Neillsville-Withee Rd., State Trunk Hy. 73, State Projects 6363 and 6328, Sect. 1, Clark Co.; constructing Bridge 173, one 55 ft. I-beam span, Cadott-Ladysmith Rd. State Trunk Hy. 27, State Project 6301, Sect. 1, Chippewa Co.

Ont., Chatham—See "Contracts Awarded."

Ont., Guelph—See "Contracts Awarded."

Ont., Lindsay—See "Contracts Awarded."

Ont., Oakville—See "Contracts Awarded."

Ont., Orangeville—See "Contracts Awarded."

Ont., Picton—See "Contracts Awarded."

Ont., Port Arthur—See "Contracts Awarded."

Ont., Port Hope—See "Contracts Awarded."

Ont., Woodstock—See "Contracts Awarded."

Que., Sherbrooke—See "Contracts Awarded."

CONTRACTS AWARDED

Alabama—State Hy. Comn., G. Scott, pres., Montgomery, grading, draining, surface treating, concrete overhead crossing over Central of Ga. R.R., on Madison St., Troy, 0.399 mi. hy., W.P.G.M. 418, Pike Co., to Grant Constr. Co., Montgomery, **$43,026.** Bids May 7. Noted May 14, C. D.

Arkansas—State Hy. Dpt., Little Rock, grading, drainage, traffic service gravel surfacing 0.55 mi. approaches to St. Louis-San Francisco R.R. overpass, Randolph Co., to McGeorge Contg. Co., Pine Bluff, **$36,734** est. $40,000*** 1.9 mi, Greene Co., to D. B. Hill, 115 North Spring St., Little Rock, **$36,781,** est. $60,000 ***grading, drainage, traffic service gravel surfacing 5.1 mi. White and Jackson Counties, to Skrainka Constr. Co., Security Bldg., St. Louis, Mo., **$30,086,** est. $40,000***grading, drainage, 2 untreated timber bridges, traffic service gravel surfacing 8.5 mi, Dallas Co., to J. W. Hecker & W. L. Graves, Camden, **$24,957,** est. $40,000***grading, traffic service gravel surfacing 0.2 mi. approaches to Bryant Overpass, Saline Co., to E. B. Mooney, Hot Springs, **$28,141,** est. $20,000***grading, drainage, concrete paving 1.6 mi. Pulaski Co., to J. P. McNulty, Pine Bluff, **$41,512** est. $40,000*** grading, drainage, bituminous surfacing 1.8 mi, Sharp Co., to Smith Bros. Constr. Co., Hot Springs, **$34,455,** est. $40,000***grading, drainage, bituminous base course, bituminous surfacing 1 mi. Junction Hy. 9 and 14, E. M. V., Stone Co. and grading, drainage, gravel base course and bituminous surfacing 2 mi. Baxter Co., to Roy Tanner Paving Co. Tuloma Bldg., Tulsa, Okla., **$18,520** and **$23,105** respectively, est. $20,000 and $40,000 respectively***grading, drainage, untreated timber bridge, traffic service gravel surfacing 6.6 mi. Franklin Co., to Grady-Smith Constr. Co., Locksburg, **$25,475,** est. $40,000***grading, drainage, bituminous on gravel surfacing 1.1 mi. Howard Co., to A. C. Kennedy, Poyen, **$13,516,** est. $20,000 ***grading, drainage structures, concrete surfacing 0.6 mi. Ashley Co., to W. F. Rogers, Little Rock, **$26,096** est. $40,000. Grand total $339,378. Bids May 27. State Hy. Dpt., Little Rock, did not receive bids May 27, for grading, drainage, traffic service gravel surfacing, 6 untreated timber bridges 7 mi. Drew Co., $40,000; grading, drainage, 1 untreated timber bridge and traffic gravel surfacing 7.7 mi. Crawford Co., $40,000. Noted May 18 and 19, C. D.—May 21, E. N.-R.

California—State Hy. Comn., C. H. Purcell, ch. hy. engr., P. Wks. Bldg., Sacramento, grading, surfacing 10.3 mi. hy between Dunnigan and Arbuckle, Yolo and Colusa Counties, and grading, asphaltic concrete and concrete paving 4.5 mi. hy. between Belmont Circle and Biola Junction, Fresno Co., to Hanrahan Co., Hobart Bldg., San Francisco, **$229,512** and **$129,710** respectively***grading, removing timber bridges 0.8 mi. hy. between Navarro River and Williams Creek, Mendocino Co., to Guerin Bros., 2145 20th Ave., San Francisco, **$12,998.** Grand total $372,220. Bids May 27. Noted June 1, C. D.

California — State Hy. Comn., Sacramento, grading, bituminous treated selected material surfacing hy. between point 2 mi. south of Rush Creek and 2 mi. north of Leevining, Mono Co., to Basich Bros., 20550 Normandie Ave., Torrance, **$119,350*****grading, penetration oil treating 5.6 mi. hy. between point 4 mi. east of Beckwith and Ede's Ranch, Plumas Co., to Fredericksen & Westbrook, P. O. Box 138, Lower Lake, **$29,760*****applying road mix surface treatment to shoulders on 24.6 mi. and surfacing portions of existing pavement with armor coat on hy. between West Boundary and 4 mi. east and between Yettem and Lemon Cove, Tulare Co., to Palo Alto Road Materials Co., 465 California Ave., Palo Alto, **$24,401.** Grand total $173,511. Bids May 20. Noted May 28, C. D.

Connecticut—State Roads Comn., J. A. Macdonald, state hy. comr., Hartford, rolled bank run gravel surfacing 17.889 ft. hy. Columbia, to John Arborio, Inc., 525 Main St., Hartford, **$31,472;** waterbound dacadam paving 9.175 ft. hy. Ledyard, to M. A. Gammino Constr. Co., 728 Valley Rd., Providence, R. I., **$67,120.** Bids May 11. Noted May 8, C.D.—**May 7, E.N.-R.**

D. C., Wash.—District Comrs., District Bldg., Wash., D. C., repairing roadways, alleys, etc., to E. B. Donaldson & Bros., 12th ... Brentwood Rd. N.E., **$128,658;** repairing ... ments and concrete bases, to McGuire & ... 1st and O Sts. S.E., **$334,700.**

D. C., Wash.—District Comrs., District ... paving streets and roadwork, etc., to ... Paving Co., 14th and K Sts., N. W., ... and **$82,562** respectively***sheet asp... concrete paving, to Highway Eng. Co., ... T Sts., N.E., **$76,909*****roadwork and all... ment, to W. F. Brenzier, 1501 South ... St., **108,510*****roadwork, etc., to A. J. ... 3446 Connecticut Ave., **$16,106.** Grand ... $373,980. Bids May 27 and 28, C. D.

★ **Ill., Chicago**—Cook Co., to Hedges ... Co., 100 North La Salle St., bituminous ... facing 4.5 mi. Wolf Rd., **$109,865;** 3.4... Plainfield Rd., **$84,287*****to Black Top ... Co., 1929 North Narragansette Ave., W... mi. 135th St., **$84,517;** 1.68 mi. Oak ... Ave., **$39,956;** 3.705 mi. Bartlett Rd., S... ***to Arcole Asphalt Co., 221 North L... St., 2.43 mi. Bartlett Rd., **$75,200;** 0.99... 143rd St., **$23,601;** 2.978 mi. 131st St., ... **074;** 4.065 mi. 131st St., **$102,196*****to H... Constr. Co., 38 South Dearborn St., 2.5... Greenwood Ave., **$71,970;** 3.98 mi. Glen... Lansing Rd., **$94,183*****to Barber Constr... 7 South Dearborn St., 1.8 mi. Lawrence ... **$51,397*****to Allied Bridge & Constr. Co., ... North Wells St., 0.872 mi. 111th St., **$12... ***to J. Mackler Co., Chicago Heights, 0.... mi. Orleans St., **$296,025*****to H. G. ... Co., Oak Park, 0.406 mi. Forest Ave., **$30,9...** Grand total $1,366,868. Bids May 19. ... May 11, C. D.—May 14, E. N.-R.

Ill., Watseka—Iroquois Co. Hy. Dpt., ... House, to R. P. Devine Co., Watseka, con... paving 1.2329 mi. Sect. 106-15d. Rout... **$19,346;** 2.144 mi. Sect. 107-15d. Route ... **$35,311;** 1.2121 mi. Sect. 111-15d. Route ... **$19,043*****to A. J. Shanks Constr. Co., Wat... 4.4518 mi. Sect. 113-15d. Route 20, $72,... Grand total $146,442. **P.W.A.** Bids D... and 13. Work started.

Iowa—State Hy. Comn., Ames, grading 1.... mi. Allamakee Co., to E. Eischied, New Hamp... ton, **$19,654*****0.345 mi. Dallas Co. to Green... Constr. Co., 210 Capitol Theatre Bldg., ... Moines, **$21,565*****0.435 mi. Marshall Co., to ... Sears Constr. Co., Cedar Lake, **$13,361*****... mi. and 0.578 mi. Montgomery Co., to J. W. ... Scothorn, Cherokee, **$26,389** and **$15,099** ... spectively***0.438 mi. Taylor Co., to F. O. ... Akin, Corning, **$5,549*****3.278 mi. road ... 11.997 mi. road in Johnson Co., to W. Hor... rabin Contg. Co., Iowa City, **$3,967** and **$17,130** respectively***6.874 mi. Linn Co., to F. T. ... Patik, Cedar Rapids, **$8,725.** Grand total $131,... 349. Bids May 26. Noted June 2, C. D.

Kansas—State Hy. Comn., at office County Clerk, Anthony (**P. means Project**), to H. J. Taylor Constr. Co., Solina, earthwork, culverts, concrete paving and light type surfacing 0.... mi. P. 50S-12-B WPMH 302-H, Part 1, **$25,829;** earthwork, culverts, concrete paving 0.393 mi. P. 59S-13 WPMH 302-H, Part 2, **$23,038;** earthwork and culverts 0.229 mi. P. 50S-13 WPH 302-H, **$693,** all foregoing in Edwards Co.*** to D. H. Hansen, Logan, earthwork, culverts 0.537 mi. P. 8-9 WPGH 452-F, Stafford Co., **$21,200*****to Banta Constr. Co., Harper, earthwork and culverts 0.413 mi. P. WPGS 551-A, Harper Co., **$27,701*****to Cook & Cone, Ottawa, sand clay surfacing 0.413 mi. P. WPGS 551-A, Harper Co., **$1,011*****to Stamey & Tull, Hutchinson, roadside improvement 0.678 mi. P. 50S-20-WPMH 399-H, Reno Co., **$4,499.** Grand total $103,971. Bids May 15. Noted May 8, C. D.—May 7, E. N.-R.

★ **Kansas**—State Hy. Comn., at office of County Clerk, Garnett (**P. means Project**), to N. L. Sherwood, Independence, earthwork and culverts 0.176 mi. P. WPSO 541-F, Neosho Co., **$29,931*****to J. Coffey, Junction City, 7.58 mi. P. 60-3-FA 539-A, Cherokee Co., **$71,815*****to Cook & O'Brien, Railway Exchange Bldg., Kansas City, Mo., 0.805 mi. P. WPSO 541-A, Neosho Co., **$43,682*****to Scherrer & Bennett, 645 Minn. St., Kansas City, 1.633 mi. P. 59-14-WPGH 113-B, **$13,891;** 2.336 mi. P. 169-18-WPGH 304-D, **$20,521;** 6.375 mi. P. 59-15-WPGH 78-A, **$128,363*****to Cook & Cone, Ottawa, light type surfacing 6.381 mi. P. 59-15-WPGH 78-A, **$6,792;** 1.633 mi. P. 59-14-WPGH 113-B, **$1,739*****to M. W. Watson, National Bank of Topeka Bldg., Topeka, 2.336 mi. P. 169-18-WPGH 304-D, **$2,466,** all foregoing in Anderson Co., ***to W. F. O'Brien, St. Paul, 0.805 mi. P. WPSO 541-A, **$1,403;** 0.176 mi. P. WPSO 541-F, **$309,** both Neosho Co.***to A. L. Cook, Ottawa, earthwork, curbing, guttering, concrete paving 0.23 mi. P. 59-10-WPGM 447-C, Neosho Co., **$42,550*****to L. A. Sherwood, Independence, earthwork, culverts, curbing, guttering, paving 0.475 mi. P. 160-39-WPGM 198-B, Montgomery Co., **$60,730.** Grand total $424,192. Bids May 16. Noted May 4, C. D.—May 7, E. N.-R. State Roads Comn., at office County Clerk Garnett, rejected bids May 16, earthwork and culverts 2.046 mi. WPSO 541-C, and light type surfacing 2.046 mi. P. WPSO 541-C, both Neosho Co.

Kentucky—State Hy. Comn., Frankfort, surfacing 0.659 mi. South Broadway, Lexington, WPMH 369 AS, Fayette Co., and 0.758 mi. Paintsville-Prestonsburg Rd., WPMH 133 D-S, Johnson Co., to Carey-Reed Co., Lexington, **$48,833** and **$26,440** respectively***roadside improvement 0.16 mi. Richmond-Lexington Rd., NRH 124 A-P1, Madison Co., to Ruth Bros., Georgetown, **$7,960.** Grand total $83,233. Bids May 29. State Hy. Comn., Frankfort, rejected bids May 29, widening 0.683 mi. Main St., in

Constr. News page 412

†Federal Government

Streets and Roads (Continued)

Scottsville, **WPMH 204** B-S, Allen Co.; withdrew bids grading, draining 3.8 mi. Jackson-Booneville Rd. 442 AG, Owsley Co. Noted May 12, C. D.—**May 14, E. N.-R.**

Maryland—State Roads Comn., Baltimore, gravel paving 1.17 mi. La Plata-Bryantown Rd., Contr. Cb-163-1-82, Charles Co., to H. W. Hewitt, Valley Lee, **$16,426**; slate base paving 2 mi. Contr. H-199-1-45, Harford Co., to Continental Contg. Co., 2508 North Charles St., Baltimore, **$24,391**. Bids May 12 and 19, respectively. Noted May 19 and 26, C. D., respectively—**May 14, E. N.-R.**

Massachusetts—Commonwealth of Massachusetts, Dpt. P. Wks., W. F. Callahan, comr., 100 Nashua St., Boston, penolithic surfacing 9,915 sq.yd. hy., Project NRM 170-C, Contr. 5, Quincy and Weymouth, incl. traffic circle and approaches to New Fore River Bridge, 6,305 sq. yd. rein.-con. surfacing, 9,915 sq.yd. penolithic type surfacing, 2,560 sq.yd. Class "I" bituminous concrete pavement, to Coleman Bros. Corp., 245 State St., Boston, **$74,721**. Bids May 19, awarded May 26. Noted May 28, C. D.—**May 14, E. N.-R.**

Mass., Chelsea—City, W.P.A. Administrator, City Hall, constructing granolithic sidewalks, day labor. $45,000. **W.P.A.**

Minnesota—State Hy. Dpt., St. Paul, paving, grading 4.1 mi. road between Spring Valley and 3 mi. east, incl. 58,458 cu.yd. excav., 43,285 sq.yd. concrete and 14,853 sq.yd. concrete wearing surface, to J. S. McLaughlin & Sons, Mankato, **$172,762**. Noted May 6, C. D.—**May 14, E. N.-R.**

Minnesota—State Hy. Dpt., St. Paul, paving 1.5 mi. State Project 5-111-21, Div. A, WPMH 754, in West 7th St. from Tuscorora St. to Purnell Ave., and 1.5 mi. same road, Div. B, in West 7th St. from Purnell to Mississippi Aves., to Thornton Bros., Co., 1343 Dayton Ave., St. Paul, **$81,076** and **$112,739** respectively•••grading 6 mi. Forestry Project 15A, National Recovery Project, between Junction Trunk Hy. 1 and southwest to Sand Lake, Lake Co., to R. Maturi & Co., Chisholm, **$69,139**•••5.2 mi. Project 21-01 WPSO 644-A, between State Aid Rd. 7, S.A.R. 5, Douglas Co., to M. Rudnick, Alexandria, **$25,991**. Grand total $288,945. Noted May 5, C. D.—May 14, E. N.-R.

★ **Minn., Minneapolis**—City, paving Twenty-Sixth St. between Chicago and Hennepin Aves. and Fourteenth St. between Nicollet Ave. and Willow St., day labor, $2,000,000, 90 per cent from relief rolls, Federal Govt. to contribute $688,000 of total program, under W.P.M.S. sponsorship.

Mo., Kansas City—City, paving 2 blocks on 7th St. from Delaware to Walnut Sts., 40 ft., city forces. $25,000. R. Waddell, city engr.

N. J., Trenton—P. Morton, city mgr., and Council, sheet asphalt on concrete repaving Sullivan Way and vitr. brick on concrete repaving East State St., to Eastern Asphalt Co., Pennsylvania Bldg., Phila., Pa., **$5,712** and **$54,615** respectively; granite block on concrete repaving South Stockton St., to Agabiti Bros., 125 Swan St., **$17,113**. Grand total $77,440. Bids May 12. **P.W.A.** Noted May 15, C. D.—May 21, E. N.-R.

★ **New York**—A. W. Brandt, comr. Hys., Albany, improving 0.24 mi. roads in Monroe Co., to J. Petrossi Sons, Inc., Box 177, Rochester, **$22,564** est. $28,400•••0.37 mi. Erie Co., to Dump Truck Service, Inc., 50 Wecker St., Buffalo, **$226,098** est. $274,878•••0.834 mi. Westchester Co., to Garofano Constr. Co., Inc., 700 South Columbus Ave., Mount Vernon, **$73,069** est. $77,546•••roadside improvement in Livingston and Ontario Counties, to F. N. Nelson & Son, 42 East Ave., Rochester, **$27,961** est. $40,980•••2.09 mi. Steuben Co., to Tomack Subsidiary, Inc., 67 Warehouse St., Rochester, **$236,311** est. $257,652. Grand total $586,003. Bids May 19. Noted May 25, C. D.—May 7, E. N.-R.

N. Y., Brooklyn—R. V. Ingersoll, pres. Brooklyn Boro, Boro Hall, to Cranford Co., 52 9th St., asphalt paving Henry St., **$7,347**; Orange St., **$13,929**•••to Brooklyn Alcatraz Asphalt Co., 407 Hamilton Ave., Monroe Pl. **$8,165**; 5th St. **$9,157**; Washington Ave. **$21,402**••• to B. Turecamo Contg. Co., New Cropsey Lane, 74th St. **$9,787**; Bath Ave. **$82,808** West 13th St. **$8,983**•••to Walthaw Corp., 1860 Bway., New York, granite paving Berry St., **$13,827**••• to Highway Impvt. & Repair Co., Furmans Island, asphalt repaving Lexington Ave., **$63,140**. Grand total $238,545. Bids May 6. Noted May 7, C. D.—Apr. 30, E. N.-R.

N. Y., Brooklyn—R. V. Ingersoll, pres. Brooklyn Boro, Boro Hall, grading, curbing, asphalt paving Jay St., to Brooklyn Alcatraz Asphalt Co., 407 Hamilton Ave., **$58,754**. Bids Apr. 8. Noted Apr. 9, C. D.

N. Y., New York—S. Levy, pres. Manhattan Boro, Municipal Bldg., waterproofing and paving superstructure for Express Highway, Sect. 1, Div. 4, 12th Ave. and Marginal St. from West 46th to West 59th Sts., to Walthaw Corp., 1860 Bway., **$184,727**. Bids May 12. Noted May 13, C. D.

N. Y., Syracuse—City, City Hall, R. D. Marvin, mayor, improving Erie Blvd. extension, and paving Alice Ave. in Solvay Dist., by relief labor. $30,000. **W.P.A.** G. L. Noble, Old Post Office Bldg., Syracuse, procurement officer W.P.A., purchases materials.

Ohio—J. J. Jaster, Jr., dir. State Hy. Dpt., Columbus, roadside improvement 1.651 mi. Sect. L, Columbus-Wooster Rd., State Hy. 24, State Route 3, U. S. Route 36, Proposal 1, 5.051 mi. Sect. P, same road, Proposal 2, and 0.054 mi. Sect. J, same road, Proposal 3, all foregoing Knox Co., to Utica Floral Co., Utica, **$10,749**•••grading, drainage structures, stabilized surface course paving 3.121 mi. Delaware Co., to R. K. McNamara, Delaware, **$22,632**•••grading, drainage structures, widening, paving with cold mixed, cold laid asphaltic concrete surface course or concrete 0.697 mi. Ottawa Co., to S. E. Johnson Co., 218 Terminal Bldg., Toledo, **$45,708**•••grading, traffic bound surface paving, constructing creosoted timber bridge with steel beam 0.164 mi. Knox Co., to D. Kissling, 1010 East Mansfield St., Bucyrus, **$8,441**. Grand total $87,630. Bids May 26. Noted May 18, C. D.—May 21, E. N.-R.

Pennsylvania—At office P. M. Tebbs, for W. Van Dyke, secy. Hys., Harrisburg, rein.-con. paving, bituminous on native stone or modified broken stone paving, grading, drainage 1.92 mi. Route 186, Sect. 5, Donegal Twp., to Cone-Eastwood, Inc., 90000 Frankstown Rd., Pittsburgh, **$98,025**. Bids May 15. Noted May 20, C. D.

Pennsylvania—At office W. W. Van Dyke, secy. Hys., Harrisburg, bituminous on native stone surfacing and extension to existing concrete bridge 1.78 mi. Route 40003, Sect. 1, Hazelton, Hazel Twp., Luzerne Co., to Union Paving Co., 1227 North Broad St., Phila., **$54,341**. Bids Mar. 27. Noted Apr. 2, C. D.—Mar. 19, E. N.-R.

Pennsylvania—At office P. M. Tebbs, for W. Van Dyke, secy. Hys., Harrisburg, rein.-con. paving, 3 rein.-con. structures 3.95 mi. Route 161, Sect. 9, Coal and Mt. Carmel Twps., Kulpmont Borough, Northumberland Co., to F. D. Kessler, Inc., 138 Queen St., Northumberland, **$244,309**. Bids May 8. Noted May 18, C. D.—Apr. 30, E. N.-R.

Pa., Kingston—City, general repairs to bituminous paved streets, $14,000; repairing sewers in various parts of city, $20,000, day labor under supervision of City Engineering Dpt., City Hall. **W.P.A.** project approved. Owner purchases material and equipment.

★ **Pa., Wilkes-Barre**—Luzerne Co., W. W. Moulter, co. controller, repairs and improvements to 85.1 mi. county hys. and various county hy. bridges, day labor and own forces under supervision of County Hy. Dpt. Est. $721,600.

South Carolina—State Hy. Dpt., Columbia, concrete widening, clearing, grading, etc., 0.358 mi. Route 76, N.R.M. 45-E, Richland Co., and asphalt resurfacing 0.468 mi. U. S. Routes 21 and 76, N.R.M. 156, Sect. 1, Contr. 1, N.R.M. 156, Sect. 3, Contr. 2 and 339-C, Richland Co., to Carolina Contg. Co., Columbia, **$27,252** and **$8,315** respectively•••concrete paving, sheet asphalt surfacing, grading, etc., 1.716 mi. Routes 25 and 178, N.R.M. 55-A, N.R.H. 55-A, Sects. 1 to 5 (inclusive), Greenwood Co., to C. Y. Thomason, Greenwood, **$67,982**•••concrete paving 2.413 mi. Route 52, 78 and 2, N.R.H. 22 and 178, Charleston Co., to W. F. Bowe, Jr., 540 Reynolds St., Augusta, Ga., **$121,583**•••earth type surfacing, clearing, grubbing, etc., 0.492 mi. County Rd., W.P.G.S. 444, York Co., to Hubbard Constr. Co., Marion, **$4,905**•••3.203 mi. Route 90, W.P.M.S. 418, Horry Co., to Robert Lee, Inc., Myrtle Beach, **$21,222**••• 10.875 mi. Route 215, W.P.M.S. 408 and W.P.S.S. 408, Aiken Co., to L. M. Gray, Gainesville, Fla., **$71,476**•••5.063 mi. Route 63, W.P.S.S. 368-B, Hampton Co., to I. J. Cleckley, Cope, **$31,237**. Grand total $353,972. Bids May 19. Noted May 27, C. D.—May 14, E. N.-R.

Utah, Provo—City Comn., rock asphalt surfacing, 6.38 mi. residential streets throughout town, to Lamph, Smith & Stevens. Price, **$28,513**. Est. $36,000. Bids May 28.

Washington—L. V. Murrow, dir. Hys., Olympia, crushed stone surfacing 22.321 mi. State Rd. 4, Tonasket to Wauconda Summit, Okanogan Co., to F. R. Hewett, 420 West 22nd Ave., Spokane, **$81,079**•••concrete paving 0.366 mi. State Rd. 21, Sixth St. city of Bremerton, U. S. Wks. Project WPMH 175D, Kitsap Co., to T. Romano, 1833 Dearborn St., Seattle, **$11,191**•••bitummous macadam surfacing, grading, constructing rein.-con. I-beam bridge, Ninth and Main Sts. to Eighth and Pine Sts. in Walla Walla, U. S. Wks. Project WPMS 290A, Walla Walla Co., to J. H. Collins Co., Box 678, Walla Walla, **$24,735**•••crushed stone, surfacing, grading, constructing timber concrete steel bridge, County Rd. C. M. St. P & P. R. R. overcrossing near McKenna, U. S. Wks. Project WPGS 261C, Thurston Co., to S. R. Gray, 430 North Meridian St., Puyallup, **$27,997**•••grading, concrete paving, and reconstructing steel, concrete approach span, bridge, State Rd. 3, Pasco Kennewick Bridge, Revision, Franklin and Benton Counties, to Sather & Sons, 12039 Greenwood Ave., Seattle, **$116,454**•••grading, concrete paving, constructing two steel, rein.-con. bridge structures, Thurston St. undercrossing in Wenatchee, U. S. Wks. Project WPGM 287A, Chelan Co., to M. P. Butler, 3419 13th Ave. S. W., Seattle, **$85,195**. Grand total $346,651. Bids May 26. Noted May 13, C. D.

Wisconsin—State Hy. Comn., and County Hy. Coms. of Chippewa, Clark, Dunn, Pierce, St. Croix and Taylor Counties, at Eau Claire, gravel surfacing 3.481 mi. Cornell Medford Rd., State Project 6361, State Trunk Hy. 64, Taylor Co., to Tillman Constr. Co., 2249 North 44th St., Milwaukee, **$11,573**•••crushed stone surfacing 2.66 mi. Ellsworth Baldwin Rd., State Project 6348, Contr. 3, Pierce Co., to C. Weiss, 1646

†*Federal Government*

Constr. News page 413

The **NEW**
STREET LIGHT
That you've been looking for

More light and less glare

1. With its deep reflector, of new design, the Form 79R luminaire increases light on the street by 90 per cent over the best comparable unit of older design.

2. With its Holophane refractor, houses are shielded and this otherwise wasted light is directed onto the roadway.

3. Because the filament of the MAZDA lamp is up in the reflector, not below it, objectionable glare is eliminated.

Less maintenance

4. The pressed-glass, single-thickness refractor, a quarter inch thick, will withstand most blows from rocks, or shots from BB guns.

5. The refractor is sealed onto the reflector with a permanent, dustproof, insectproof, weatherproof seal—eliminating practically all cleaning of the inside.

6. Less breakage of the glassware, because of its strength and because it can never be removed from the reflector.

Lower cost

7. Price, with the Holophane refractor, as low as $35.10, list, from which is deducted a liberal discount.

8. Installation is easier because of the very light weight.

Let us send you our publication on this remarkable, new Novalux luminaire. More than 11,000 have been sold since its introduction a few months ago. General Electric, Schenectady, New York.

GENERAL ELECTRIC

General Electric
Department 6A-201
Schenectady, N. Y.

Please send me publication GEA-2276A on the new Form 79 and 79R street-lighting luminaire.

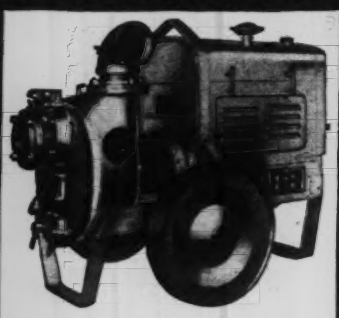
Name .....

Street .....

City ..... State .....

500-171

BUYING A PUMP?

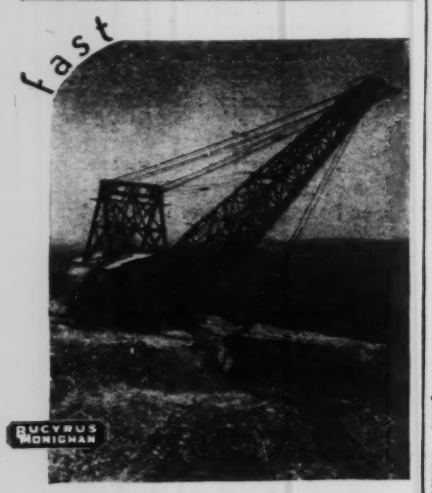


INSIST ON:

- Faster, 100% Automatic Priming,
- Greater Efficiency in Any Size, at Any Lift,
- Thousands of Hours of Heavy Duty Service.
- Cut Your Costs with" Sure Prime" Pumps—2" to 10" Sizes, Capacities 7000 to 200,000 G. P. H. Send for New Catalog and Prices.

THE JAEGER MACHINE CO.
200 Dublin Ave., Columbus, Ohio

JAEGER



SWIFT acceleration at full power — quick and accurate stops blended to form a smooth high speed swing — walking traction that saves time moving—these are some of the reasons for the Bucyrus-Monighan's high yardage output. Manufactured by Bucyrus-Monighan Company, Chicago, Ill.

BUCYRUS-ERIE

EXCAVATING, DRILLING & MATERIAL-HANDLING EQUIPMENT • • SOUTH MILWAUKEE, WIS.

Streets and Roads (Continued)

Denton St., La Crosse, **$11,456*****grading, draining 6.336 mi. Cadott Ladysmith Rd., State Project 6301, State Trunk Hy. 27, Chippewa Co., to A. Schroeder, Jr., 1011 West Capitol Dr., Milwaukee, **$67,357*****3.491 Cornell Medford Rd., State Trunk Hy. 64, State Project 6361, Taylor Co., to J. W. Lathers, Beloit, **$18,541*****2.66 mi. Ellsworth Baldwin Rd., State Project 6348, State Trunk Hy. 63, Pierce Co., to Colburn Thurston Co., 2837 Sunset Blvd., Minneapolis, Minn., **$20,179*****constructing 100 ft. span truss structures, Cadott Ladysmith Rd., Cornell Holcombe Rd., State Project 6301, Sect. 3, State Trunk Hy. 27, Chippewa Co., to Eau Claire Eng. Co., Eau Claire, **$24,622*****constructing structures, Ellsworth Baldwin Rd., State Project 6348, U. S. Hy. 63, Pierce Co., to Highway Supply Co., Inc., Webster, **$9,290*****constructing three 60 ft. I-beam span bridge, Bloomer New Richmond Rd., State Project 6220, State Trunk Hy. 64, Dunn Co., to R. G. Hase, Spring Green, **$27,358*****constructing structures, Ellsworth Baldwin Rd., State Project 6347, U. S. Hy. 63, St. Croix Co., to J. E. Hinman & Son, Glenwood City, **$7,341**. Grand total $197,717. Bids May 26. Rejected bids May 26, grading, draining 4.56 mi. Pittsville Neillsville and Neillsville Withee Rds., State Projects 6363 and 6328, Clark Co., will readvertise. Noted May 15, C. D.—May 21, E. N.-R.

B. C., Hollyburn—City, 2 in. asphaltic macadam surfacing 6 mi. various streets, 20 ft. to General Constr. Co. Ltd., Granville Island, Vancouver, **$80,500.**

Ont., Chatham—Kent Co., grading and widening 18 mi. roads, 3 mi. gravel mulch, 1,500 lin.ft. concrete paving and 2 mi. surface treatment, day labor. W. D. Colby, engr.

Ont., Guelph—Wellington Co., resurfacing 300 mi. roads, day labor. $40,000. W. H. Keith, engr.

Ont., Lindsay—Victoria Co., constructing 40 mi. gravel roads, day labor. H. D. Milford, engr., will purchase materials.

Ont., Oakville — County of Halton, surface treating ½ mi. and graveling 38 mi. roads, day labor under supervision of Roy F. Smith, engr. In market for materials.

Ont., Orangeville—Dufferin Co., surface treating ½ mi. and graveling 80 mi. roads, day labor. J. H. Beatty, engr., will purchase materials.

Ont., Picton—J. Leavens, engr. for Prince Edward Co., will surface treat 29 mi. and gravel 3 mi. roads, day labor. In market for materials.

Ont., Port Arthur—Municipality, paving and repairing streets, day labor. $100,000 voted. City Engineer to purchase materials.

Ont., Port Hope—Haldimand Co., surface treating 10 mi. and bituminous surfacing 20 mi. roads, day labor under supervision of J. D. Miller, engr. In market for materials.

Ont., Woodstock—Oxford Co., surface treating 6 mi. and graveling 86 mi. roads, day labor under supervision of J. N. Meathrell, engr., who will purchase materials.

Que., Sherbrooke—Municipality, waterbound macadam paving 7 streets, $80,000; sheet asphalt on concrete paving 7 streets, $107,700; cement sidewalks, $17,400, day labor. T. Tremblay, engr.

†T. H., Hickman Field—Con. Q.M., improving roads at Hickman Field, to M. Akiona, 1141 Gulick Ave., Honolulu, **$97,500**; watermains and connections, to J. Hansen, 753 Ola Moana Rd., Honolulu, **$64,891*****railroad track and siding, to M. W. Moody, 2890 Kalihi St., Honolulu, **$55,883**. Grand total $218,274.

EARTHWORK, IRRIGATION, DRAINAGE AND WATERWAYS

PROPOSED WORK

Pa., Sharon—City, F. S. Williams, clk., taking quotations on test drillings, dam on Shenango River, 100 ft. below Chestnut St. bridge. L. E. Burnside, city engr.

N. B., St. Stephen—International Joint Waterways Com., plans dredging 44 mi. St. Croix River from International Bridge to Mark's Landing, U. S. A., $20,000; also constructing high water wharf on Calais side.

BIDS ASKED

†Arkansas—June 16, by U. S. Eng., Vicksburg, Miss., constructing 4,905,000 cu.yd. earthwork on west bank of Mississippi River and 997,000 cu.yd. earthwork on south bank of Arkansas River. Noted May 27, C.D.—June 4, E.N.-R.

†Calif., Oakland—June 22, by U. S. Eng., Custom House, San Francisco, dredging 416,500 cu.yd. in Brooklyn basin and Tidal Canal, Oakland Harbor, incl. dredging an area 1,930 ft. long and 1,020 ft. wide on bottom.

†Conn., Hartford — June 6, by U. S. Eng., Providence, R. I., constructing 60,000 cu.yd. in Connecticut River south of here. Bids May 13 rejected. Noted May 21, C.D.

†Florida—June 16, by U. S. Eng., Jacksonsonville, constructing 75,000 lin.ft. riprap revetment wall and backfill for berm and levee embankment on east shore Lake Okeechobee, incl. 90,000 cu.yd. rip rap stone; 169,000 cu.yd. rip rap backfill; adv. E. N.-R., June 11.

Constr. News page 414

†Idaho—June 25, by Bureau Re... Ashton, constructing diversion dam ... headworks, and earthwork, canal lin... tures for Cross Cut Canal, Upper Sn... Project, incl. 265,000 cu.yd. all class... 8,150 cu.yd. structure excav., Spec. 6...

†Illinois and Indiana — July 1, ... Eng., 932 U. S. Post Office Bldg., ... Van Buren Sts., Chicago, Ill., dredging ... posing of about 1,152,900 cu.yd. pla... urement other than ledge rock from ... Harbor.

†Ill., Peoria—July 1, by U. S. En... Post Office Bldg., Chicago, furnishing, instal... and constructing lock gates tainter valves, ... ating machinery, etc., at Peoria Lock, in Illino... River about 4.5 mi. below here; adv. ... N.-R., June 11.

†Iowa—June 17, by U. S. Eng., Ci... Natl. Bank Bldg., Omaha, Neb., constructing ... lin.ft. standard dikes, 11,380 lin.ft. re... and 5,370 lin.ft. abatis in Missouri R... at Louisville and Blencoe Bends, near Blen...

†Mass., Nantucket—See "Contracts A...

†Mich., Alpena—June 23, by U. S. Eng., Detroit, dredging 258,000 cu.yd. of ... from Alpena Harbor; adv. E. N.-R., Jun...

†Missouri and Illinois—June 16, by ... Eng., Court and Custom House, 12th ... and Market Sts., St. Louis, Mo., constructing timber piling dikes in Mississippi River ... 3,000 lin.ft. at Liberty; 5,000 lin.ft. at ... Island; and 2,000 lin.ft. at Crain Island ... E. N.-R., June 11.

Nebraska and Iowa—June 19, by U. S. Eng., City Natl. Bank Bldg., Omaha, Neb., furnishing part of material and constructing 25,830 ... standard dikes, 5,000 lin.ft. revetment and 5,850 lin.ft. abatis in Missouri River at ... Point to California Bends near Blair, Neb., 12... 035 lin.ft. standard dikes, 8,545 lin.ft. ... ment and 7,530 lin.ft. abatis in Missouri River at Little Sioux to Soldier Bends, in Missouri River, about 3 mi. upstream from Monona, Ia.

Nebraska—June 19, by Loup River Public Power Dist., Columbia, completing drainage structures and bank protection near Genoa, Monroe and Columbus, incl. constructing siphon under tailrace, excavating 2,000 cu.yd. drainage ditch, constructing drop structure, 260 lin.ft. brush and wire fence, tailrace wier protection consisting 100 lin.ft. anchored willow jetty and 1,000 sq.yd. anchored willow mat., furnishing, erecting penstocks for Columbus Hydro-Electric Power Station at Columbus. C. B. Fricke, pres.

†New Jersey—June 18 (extended date) by U. S. Eng., 2nd Dist., New York, restoring stone jetties and bulkheads at mouth of Manasquan River. Noted May 14, C. D.—May 21, E. N.-R.

†N. J., Burlington—June 16, by U. S. Eng., Phila., Pa., dredging Delaware River, east of Burlington Island, opposite here.

†New York and New Jersey—June 23, by U. S. Eng., 2nd Dist., 39 Whitehall St., New York, dredging 54,000 cu.yd. earth material and 415,000 cu.yd. ledge rock from New York and New Jersey Channels, near west end of Kill Van Kull.

New York—June 25, by Dpt. P. Wks., Div. Eng., State Office Bldg., Albany, excavating in Barge Canal, from Lock 21, at New London and Oneida Lake, Sylvan Beach, Contr. U.S.-17; adv. E. N.-R., June 11.

New York—June 29, by Dpt. P. Wks., Div. Eng., State Office Bldg., Albany, excavating Barge Canal from Hudson River to Lock 2, at Waterford, and from Guard Gate 2, at Waterford to Lock B, near Scotia, Contr. U.S.-11; adv. E. N.-R., June 11.

New York—June 30, by Dpt. P. Wks., Div. Eng., Albany, excavating in Barge Canal from Lock 2, at Fulton, to Lock 5, at Minetto, Contr. U.S.-14. F. S. Greene, supt. P. Wks.; adv. E. N.-R., June 11.

†N. Y., Buffalo—U. S. Eng., Buffalo, taking bids dredging 18,000 cu.yd. from Buffalo River and Buffalo City Shop Canal.

†N. Y., New York—June 26, by U. S. Eng., Army Bldg., 39 Whitehall St., dredging 2,662,000 cu.yd. place measurement of material in Upper Bay, New York Harbor; adv. E. N.-R., June 11.

†O., Huron—June 18, by U. S. Eng., 510 Federal Bldg., Buffalo, N. Y., dredging 316,000 cu.yd. in Huron Harbor; adv. E. N.-R., June 11.

†Oregon and Idaho —, June 17, by Bureau Reclamation, Ontario, Ont., constructing structures North Canal Laterals 551 to 59.5-0.1, Dead Ox Flat Division, Owyhee Project, near Ontario, Ore., incl. 1,800 cu.yd. all classes of excav. R. F. Walter, Denver, Colo., dist. engr.

†Pennsylvania and New Jersey—June 20, by U. S. Eng., Phila., Pa., dredging 1,065,000 cu. yd. in Delaware River between Phila., Pa., and Florence, N. J.

Pa., Johnstown—See "Contracts Awarded."

†Virginia—June 17, by U. S. Eng., 1068 Navy Bldg., Wash., D. C., dredging and disposing of 32,000 cu.yd. material from Milford Haven; 142,000 cu.yd. from York River at West Point; adv. E. N.-R., June 11.

†Wis., Menasha—July 2, by U. S. Eng., Milwaukee, removing old dam and constructing new dam, here; adv. E. N.-R., June 11.

LOW BIDDERS

★ **†Massachusetts**—U. S. Eng., Custom House, Boston, June 2, dredging in Cape Cod Canal, from M. A. Breymann Dredging Co., 17 Battery Pl., New York, $1,347,718. Noted May 22, C. D.—May 28, E. N.-R.

†Federal Government

Earthwork, etc. (Continued)

CONTRACTS AWARDED

†**Florida**—U. S. Eng., Ocala, restoring earthen dike diversion canal, at Oklawaha River Valley, to L. M. Harvey, Pensacola, $18,737. Bids May 15. Noted May 4, C. D.—May 7, E. N.-R.

★†**Massachusetts**—U. S. Eng., Custom House, Boston, Mass., dredging Hog Island Channel, Buzzards Bay, stas. 490 to 670, to Atlantic Gulf & Pacific Co., 15 Park Row, New York, $687,030. Bids May 28. Noted June 8, C. D.

†**Mass., Nantucket**—U. S. Eng., Providence, R. I., dredging 92,000 cu.yd. from Nantucket Harbor, day labor. Bids May 21 rejected. Noted May 26, C. D.—Apr. 9, E. N.-R.

★†**Mont., Fort Peck**—U. S. Eng., Postal Telegraph Bldg., Kansas City, Mo., building and placing 8 emergency gates in 4 tunnels, with operating machinery and electrical equipment for Fort Peck Dam, to Bartlet Hayward Co., 200 Scott St., Baltimore, Md., $1,093,610. Est. $1,000,000. Bids June 2, awarded June 3. Noted June 3, C. D.—May 28, E. N.-R.

★†**Nebraska and Iowa**—U. S. Eng., City Natl. Bank Bldg., Omaha, Neb., dikes and revetment in Missouri River at Papillion and Plattsmouth Bends, to A. W. Farney, Inc., 114 West 10th St., Kansas City, Mo., $229,780***dikes and revetment in Missouri River at Morgan to Indian Cove Bends, to Addison Miller, Inc., Minnesota Mutual Life Bldg., St. Paul, Minn., $234,283***dikes and revetment at Hamburg Bend, to Massman Constr. Co., 732 New York Life Bldg., Kansas City, Mo., $203,143. Grand total $607,206. Bids May 25. Noted June 2, C. D.

†**New Jersey**—U. S. Eng., 2nd Dist., 30 Whitehall St., New York, dredging in Passaic River, to Gahagan Constr. Corp., 141 Remsen St., Brooklyn, N. Y., $172,492; dredging in Shrewsbury River, to Lukens Dredging & Contg. Corp., 402 Snow Bldg., Baltimore, Md., $32,928. Bids May 18. Noted May 20, C. D.

★**Pa., Johnstown**—City, City Hall, D. Shields, mayor, dredging Conemaugh River through city, cleaning Sam's Run, dredging and cleaning Cheney's Run, day labor under supervision of H. Lee Wilson, city engr., City Hall. $577,000. W.P.A. approved revised plans. H. Lee Wilson, city engr. Noted May 28, E. N.-R.

†**S. C., Charleston**—U. S Eng., Custom House, dredging in shipyard pier, to Standard Dredging Co., 80 Broad St., New York, N. Y. $25,252. Bids May 29. Noted June 1, C. D.

†**Virginia**—U. S. Eng., Post Office Bldg., Baltimore, Md., dredging 292,700 cu.yd. from Onancock River, to Atkinson Dredging Co., Norfolk, Va., $28,333. Mids May 11. Noted Apr. 24, C. D.—Apr. 30, E N.-R.

†**Washington**—Bureau Reclamation, Yakima, Wash., constructing earthwork, canal lining, and structures Yakima Ridge Canal, Roza Div., Yakima Project, near Yakima, to J. A. Terteling & Sons, Boise, Idaho, $275,213. Bids Apr. 13. Noted Apr. 16, C.D.—Mar. 26, E.N.-R.

B. C., Prince Rupert—Dpt. P. Wks., Ottawa, Ont., constructing floating breakwaters, to John Currie & Son, Prince Rupert, $9,741; dredging, to Amour Salvage & Touring Co., Prince Rupert, $6,765.

New Brunswick—Dpt. P. Wks., Ottawa, Ont., constructing breakwater repairs, etc., at Negro Point and Fort Dufferin, to Chas. V. Billie, Montreal, Que., $77,500.

North West Territory, Great Bear River (St. Charles Rapids)—Dpt. P. Wks., Ottawa, Ont., constructing portage road and dock improvements St. Charles Rapids, to Joseph T. Doyle, Edmonton, Alta., $15,915.

N. S., East River—Dpt. P. Wks., Ottawa, Ont., removal of lock walls, etc., to **T. C. Gorman** (Nova Scotia) Ltd., Halifax, $15,457.

UNCLASSIFIED

PROPOSED WORK

Calif., Bakersfield—SWIMMING POOLS—City, election Aug. 25, to vote bonds for swimming pools. $117,580.

Calif., Tustin — PLEASURE PIERS — Irvine Co., c/o Major T. Wyman, Jr., 751 South Figueroa St., Los Angeles, has made application to War Dpt., for permit to construct 2 pleasure piers and install 2 units of floating boat slips along the easterly side of the channel, easterly of Balboa Island, one unit with length of 500 ft. to extend 80 ft. channelward, the other with length of 300 ft. to extend 90 ft. channelward from U. S. Bulkhead line in Newport Bay. To exceed $23,000.

Ia., Sioux City — SWIMMING POOL — City plans constructing swimming pool at north side of park. $35,000.

Mo., Webster Groves (St. Louis P. O.)—PARKS, etc.—City, c/o J. B. Chipman, mayor, requested to pass ordinance calling for election in June, for $175,000 bonds for acquisition of sites for parks and playgrounds, and constructing recreational facilities, incl. swimming pool, bathhouse. Est. about $90,000. J. B. Clayton, city engr.

N. Y., Brooklyn—BLEACHERS—Bd. Educ., 500 Park Ave., New York, plans by W. C. Martin, Flatbush Ave. Extension and Concord St., drainage and bleachers, 2502 Avenue P. Est. about $38,000.

N. Y., New York—COMFORT STATION, etc. —Dpt. Parks, Arsenal Bldg., Central Park, plans by A. Embury, 2nd, c/o owner, comfort station, recreation building, wading pool, Central Park opposite 71st St. $37,000.

N. Y., Rochester—PLAYGROUND—City, City Hall, plans constructing North Side Playground, 1st and 2nd Sts., opposite School 27. To exceed $100,000.

N. C., Smithfield—RURAL ELECTRIFICATION PROJECT—Johnston Co. Electric Membership Corp., plans 300 in. rural electrification to serve 1,550 customers. $300,000. D. Bagley, state REA dir., Raleigh. Directors are S. Sanders, Smithfield, N. C., Dr. W. H. Atkinson, Wash., D. C., et al.

Pa., Williamsport—BURIAL GROUND DEVELOPMENT—Quaker Hill Cemetery, Inc., Williamsport, W. J. Winner, R. D. No. 1, secy., plans developing burial ground in Quaker Hill Sect., incl. grading, landscaping, water system, administration building, roads, ornamental iron fence, etc. To exceed $23,000.

Tenn., Johnson City—ELECTRIC DISTRIBUTION SYSTEM—City, c/o E. J. Quillen, recdr., preliminary plans electric distribution system, power substation and transmission lines. City plans to buy power from T.V.A. Lide & Adler Co., Woodward Bldg., Birmingham, Ala., engrs. Noted Apr. 4, C. D.—Apr. 11, E. N.-R.

Tenn., Knoxville—ELECTRIC POWER and LIGHTING DISTRIBUTION SYSTEM—Hess & Barton, Inc., contractors, 526 4th Ave., Pittsburgh, Pa., retained to construct first unit of proposed municipal power distribution, have given notice on City Mgr. G. Dempster that it is cancelling its contract. The letter from W. F. Hess, pres. of company, charged the city amended its contract for a P. Wks. Administration loan and grant of $2,600,000 without consulting contractors. A further reason for withdrawal was the long delay in work due to injunctions obtained by Tennessee Public Service Co. The contracting firm has filed a $50,000 damage suit against the utility and its bonding company on account of the delay. Noted Jan. 17, C.D.—Jan. 24, E.N.-R., under "Contracts Awarded."

Tex., Victoria—PIPE LINE—Humble Pipe Line Co., Victoria, plans 20 mi. pipe line from terminus at Tom O'Connor Field, in Refugio Co., to Heyser, in Calhoun Co., also plans extending line from Heyser to Placedo Field, 6 mi., probably use 6- to 8-in. welded pipe. Private plans.

Alta., Brooks — POWER LINES — Calgary Power Co. Ltd., J. Cuthbert, clk., plans to extend lines from Bassano to Brooks. $60,000.

Alta., Edmonton—PIPE LINE—Dominion Gas & Electric Co. Ltd., plans extensive work, incl. duplication of main transmission pipe line from the Viking field, constructing 62 mi. power line from St. Paul to Vegreville, extensive rehabilitation of existing lines and laying 5¼ mi. 12¾ in. pipe.

N. B., St. Stephen—WHARF—See "Earthwork, Irrigation, Drainage and Waterways."

Ontario—POWER DEVELOPMENT—Ontario Hydro-Electric Power Comn., 190 University Ave., Toronto, plans transformation of Gibson Lake into storage basin in connection with the establishment of 250,000 hp. development at Decew Falls for Niagara Falls and Brockville, also power development at Morrisburg.

★**Quebec**—RAILWAY—Canadian Pacific Ry. Co., Montreal, Que., soon takes bids constructing railway from Angliers to Rouyn, $2,500,000 to $3,000,000.

★**Que., Senneterre** — RAILWAY — Canadian Natl. Rys., Montreal, soon takes bids constructing 99 mi. new line from Senneterre on the northern transcentinental route about 225 mi. northwest of Ottawa, running southwesterly and then westerly to tie on at Rouyan with the Taschereau-Noranda branch line. Est. about $3,500,000-$4,000,000.

BIDS ASKED

Ga., Douglas—GYMNASIUM, etc.—June 17, by Regents of University, Atlanta, constructing auditorium, gymnasium and swimming pool. $30,000. R. H. Driftmaier, Athens, archt.

N. Y., Buffalo — SWIMMING POOL — See "Contracts Awarded."

N. Y., Mount Morris—PARK—See "Contracts Awarded."

N. Y., New York—PLAYGROUND—See "Contracts Awarded."

N. Y., Rochester—HIGHWAY LIGHTS—See "Contracts Awarded."

N. Y., Syracuse — PARKS — See "Contracts Awarded."

†**Va., Yorktown**—PIERS—June 17, by Treas. Dpt. at office Sup. Archt., Wash., D. C., repairing piers, Spec. 8201.

†**Va., Yorktown**—BOILERS—Yards & Docks, Navy Dpt., Wash., D. C., taking bids repairing boilers, Spec. 8209. (Date not set.)

†**T. H., Pearl Harbor**—FLOATING DRY DOCK—Yards & Docks, Navy Dpt., Wash., D. C., takings bids constructing 1,016 ft. long,

†*Federal Government*

Constr. News page 415

Follow the swing

to

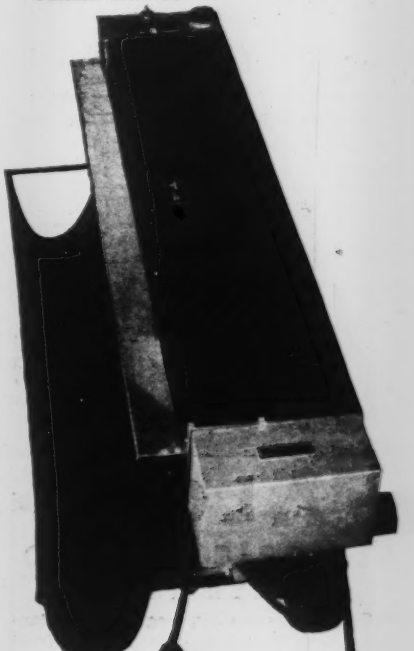
Ozalid

TRADE MARK REG. U.S. PAT. OFFICE

WHITE PRINTS

- Easier to make . . . easier to read . . . ideally suited to requirements of job foreman, field office or home office. Permanent and unaffected by any ordinary conditions of use.
- The ONLY complete technical reproduction process offering choice of blue, black, maroon or sepia line against WHITE ground on the *full range of standard and transparent papers and cloth.*
- DRY DEVELOPMENT means just two steps in production, eliminating shrinkage and buckling, does away with the mess and labor of old time methods.
- Highly economical . . . one gallon of ammonia, costing less than a dollar, will develop 10,000 square feet of OZALID Prints. Only the vapor touches the prints.
- Prints are always true to scale.

Write us at once, using the coupon below, for full details of standard and portable equipment and FREE sample book of OZALID materials.



Ozalid TYPE "600" PORTABLE DRY DEVELOPER

MAIL THIS COUPON TODAY

OZALID CORPORATION
354 Fourth Avenue, New York, N. Y.
Please send at once full details of OZALID MACHINES together with samples of prints and prices . . . all without obligation.

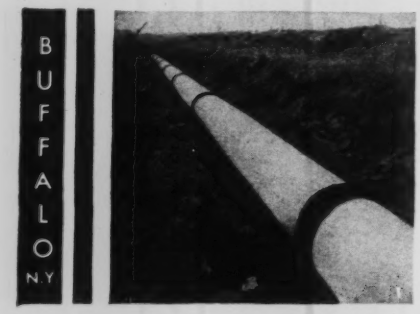
Name .....
Company .....
Address .....

A ONE HUNDRED PER CENT MORETRENCH WELLPOINT SYSTEM makes wet jobs dry—and PROFITABLE. Cheaper—less units, operation costs—half of other methods. "Your system continues to function perfectly and never clogs up," says a MORETRENCH user.

We've been at it ten years and can dry up any job.

MORETRENCH CORPORATION

Works: Rockaway, N. J. Sales Office: 90 West St., New York City



ALCO

ELECTRIC WELDED STEEL PIPE

High carrying capacity, long life, great tensile strength, fewer field joints, freedom from breakage and leakage, low initial and ultimate costs — are important reasons why leading cities throughout this country prefer ALCO ELECTRIC WELDED STEEL PIPE.

Alco Pipe is made in diameters ranging from 20" to 96", for either water supply or sewage disposal.

ALCO PRODUCTS, INC.

30 Church St., New York, N.Y.

division of

American Locomotive Company

Branch offices in principal cities

Unclassified (Continued)

165 ft. beam steel floating dry dock, Spec. 8228.

CONTRACTS AWARDED

Calif., San Francisco — ADMINISTRATION BUILDING, etc.—See "Public Buildings."

†**Calif., San Francisco**—FLOOD LIGHTING SYSTEM—Con. Q.M., Fort Mason, flood lighting system at Crissy Field, Presidio, to H. S. Tittle Co., 85 Columbia Square, $1,191. Bids May 15.

★ **Ia., Lucas**—RAILROAD—Chicago, Burlington & Quincy R.R. Co., A. W. Newton, ch. engr., 547 West Jackson Blvd., Chicago, Ill., grading 5 mi. second track, incl. one 100 ft. deck plate girder and two 60 ft. deck plate girders, to Edward Peterson Co. & Associates, 708 W.O.W. Bldg., Omaha, Neb., about $500,000. Noted Apr. 21, C. D.

N. J., Newark—PARK BUILDINGS—Essex Co. Park Comn., 115 Clifton Ave., repairing, repainting buildings, property at Branch Brook, Weequahic, West Side and River Bank Parks, Newark, Bloomfield and Vanticano Park, Nutley, **W.P.A.** labor. Materials, i.e. lumber, paint will be purchased by W.P.A. Procurement Division, tools by County. H. J. Phillips, 115 Clifton Ave., engr.

N. J., Newark—SUBWAY—City, Dpt. P. Affairs, City Hall, constructing new city subway, partly open cut and partly subway, contract for laying track on Sect. 1, City Railway from Mulberry St. and incl. loop under new Penn Station, to Railway Industrial Constr. & Repair Co., 262 Paulson Ave., Passaic, $35,405. Noted June 1, C. D.—June 4, E. N.-R.

New York—STATION FINISH—Bd. Transportation, J. H. Delaney, chn., 250 Hudson St., New York, constructing station finish work for Route 108, Sects. 10 and 11, to Meads Eng. Corp., 217 West 14th St., New York, $216,416. Bids Apr. 28. Noted Apr. 29, C. D.—Apr. 16, E. N.-R.

N. Y., Buffalo — SWIMMING POOL — City, City Hall, constructing large rein.-con. swimming pool and shelter house, in Shiller Park Playground, own forces. To exceed $23,000. Owner will purchase materials.

N. Y., Mount Morris—PARK—Village, Village Hall, constructing 8 acre park in Mills St., incl. grading, planting, seeding, tennis courts, baseball diamond, running track, skating rink, relief labor. To exceed $23,000. **W.P.A.** Site purchased. Owner will purchase material and playground equipment.

N. Y., New York — PLAYGROUND — Dpt. Parks, Arsenal Bldg., Central Park, New York, constructing playground and recreation building, 101st St., 2nd and 3rd Aves., relief labor, $35,000. A. Embury, 2nd, c/o owner, archt. **W.P.A.** Owner is purchasing material.

N. Y., Rochester — HIGHWAY LIGHTS — Rochester Gas & Electric Corp., 89 East Ave., installing 105 new sodium type highway lights in St. Paul Blvd., between city line and Lake Ontario, own forces, E. R. Crofts, in charge. Owner will purchase material.

N. Y., Syracuse—PARKS—City, R. D. Marvin, mgr., City Hall, rehabilitating 600 acres of land for parks and playgrounds, incl. repaving, roads, sidewalks, paths, replacing trees, shrubs, resurfacing and grading playground, by relief labor, $75,000. **W.P.A.** G. L. Noble, Old Post Office Bldg., Syracuse, procurement officer P.W.A., purchases materials.

Pa., Erie—AIRPORT—City, grading, draining, boundary lights, landing lights, 1 runway 150x2,200 ft., two runways 100x2,500 ft., oiled gravel surface hangar at airport, constructing block face, brick front, 80x120 ft., steel truss roof construction hangar, relief labor. Est. $400,000. A. N. Aitken, city engr. **W.P.A.** Sanford McGovern, W.P.A. office, 134 East 10th St., preliminary engr.

†**S. C., Charleston**—WHARF—U. S. Eng., replacing dock, incl. driving four 4 pile dolphins and 22 fender piles at north pier U. S. Eng. Dock, east end Market St., to Salmons Dredging Co., Charleston, $1,798. Bids Apr. 28. Noted May 4, C. D.—May 7, E. N.-R.

†**Va., Bowling Green** — ELECTRIFICATION LINES—Rural Electrical Administration, 2000 Massachusetts Ave. N.W., Wash., D. C., electrification lines, to Harrison-Wright Constr. Co., Charlotte, N. C., $79,356.

MATERIALS AND EQUIPMENT

PROPOSED WORK

SPLIT WOOD PULLEYS—**Los Angeles, Calif.**—D. P. Nicklin, purch. agt. Dpt. Water & Power, 207 South Bway., rejected bids May 28, furnishing split wood pulleys, Spec. 1956. To exceed $2,000. Noted May 5, C. D.

STEEL STORAGE TANKS — **Wethersfield, Conn.**—Ballard Oil Co., 252 Asylum St., Hartford, plans purchasing and installing two 20,000 bbl. additional steel storage tanks for oil capacity. Property to be leased from October 11 by Tidewater Oil Co. Private plans.

TRAFFIC CONTROL LIGHTS—**Chicago, Ill.**—City, City Hall, plans installing progressive and synchronized traffic control lights in Chicago Park District Area, North Ave., Roosevelt Rd., Austin Blvd. and Canal St., also on Golden Ave. from Roosevelt Rd. west to city limits, $125,000. City Council recommended $31,400 appropriation as their share, the remainder to be defrayed by Chicago Park Dist.

FIRE ENGINES — **Beverly, Mass.** — City, Mayor's Office, City Hall, soon takes bids purchasing 2 fire engines. $9,000 appropriated for same.

TANKS—**New Bedford, Mass.**—David Duff & Son, 640 Pleasant St., making plans furnishing, installing 5 vertical and 5 horizontal oil tanks, Fish Island. Geo. H. Dyson, Inc., 25 Huntington Ave., Boston, engrs.

FIRE FIGHTING EQUIPMENT — **Mountain Lake, Minn.**—Village and Townships of Midway and Lake, plan purchasing jointly of fire fighting equipment. $2,285 authorized.

STEEL TANKS—**St. Louis, Mo.**—M. H. Reis, 1400 North Vandeventer Ave., applied for permit to install three 1,000 gal. underground steel tanks for gasoline for use in automobile service station at 1400 North Vandeventer Ave.

STEEL TANKS — **St. Louis, Mo.** — Socony Vacuum Oil Co., 4140 Lindell Blvd., applied for permit to install two 1,000 gal. underground steel tanks for gasoline and one 1,000 gal. underground steel tank for fuel oil for use in automobile service station, 1204 Chouteau Ave.

TANKS—**St. Louis, Mo.**—York Building & Investment Co., c/o 6427 Chippewa St., applied for permit to install three 1,000 gal. underground steel tanks for gasoline in automobile service station, 6427 Chippewa St.

†DRAGLINE—**Omaha, Neb.**—U. S. Eng., 819 City Natl. Bank Bldg., rejected bids May 22, furnishing 1 Diesel driven crawler type dragline, capable of handling 28,000 lb. at 15 ft. radius with 50 ft. boom. $15,000. Noted May 15, C. D.

PUMPERS—**East Meadow, N. Y.**—East Meadow Fire Dist., voted to appropriate $5,000 for purchasing new pumpers to hold 500 gal. water.

STORAGE TANKS—**Rochester, N. Y.**—Texas Co., 135 East 42nd St., New York, Mr. Hamilton, Powers Hotel, Rochester, in charge, plans purchasing 500-1,000 gal. storage tanks, for large gasoline station, Monroe Ave. and Rutzers St. To exceed $1,000.

TANKS—**Rochester, N. Y.**—Texas Co., 135 East 42nd St., New York, Mr. Hamilton, Powers Hotel, Rochester, in charge, plans purchasing 500-1,000 gal. steel gasoline storage tanks for service station at East Ave. and Wing Pl. To exceed $1,000.

TANKS—**Rochester, N. Y.**—Texas Co., 135 East 42nd St., New York, Mr. Hamilton, Powers Hotel, Rochester, in charge, plans purchasing 500-1,000 gal. storage tanks and equipment for new proposed service station, East Main St. and Beach Crescent. To exceed $1,000.

CEMENT—**Cleveland, O.**—City, C. B. Patterson, purch. agt., soon takes bids 1,000 bbl. quick setting cement.

TRACTORS, etc.—**Cleveland, O.**—City, C. B. Patterson, purch. agt., soon takes bids 15 tractors and 30 trailers.

TRUCKS—**Cleveland, O.**—City, C. W. Patterson, purch. agt., soon takes bids 25 garbage trucks.

†NAILS, SHEET LEAD, etc.—**San Antonio, Tex.**—Treas. Dpt., State Procurement Officer, Smith-Young Tower Bldg., soon takes bids nails, sheet lead, ingot, oakum drains, water pipe, tees, etc., f.o.b. Plainview; shovels, scoops, axes, mattocks, picks, handles, hatches, hammers, saws, files, saw sets, post hole diggers, bars, trowels, chisels, tape, rules, cotton trot lines, covers, brushes, padlocks, sledges, f.o.b. Groveton: 4,800 tons washed gravel and 150 yd. washed gravel, f.o.b. Silsbee.

TANKS—**Shediac, N. B.**—McCall Frontenac Oil Co. Ltd., Montreal, Que., purchases site on Main St. for service station, will require three 1,000 gal. gasoline tanks and 4 double pumps.

ROAD EQUIPMENT—**Port Hope, Ont.**—J. D. Miller, engr. Haldimand Co., interested in prices of new road equipment. $5,000 available.

TANKS—**Ste. Anne de Bellevue, Que.**—Coopers Garage Co. applied for permission to establish gasoline station and will require two 1,000 gal. steel tanks and 2 double pumps. To exceed $1,000.

BIDS ASKED

ASPHALTIC CONCRETE MIX—**Merced, Calif.**—City Council, taking bids 400 tons asphaltic concrete pavement mix.

LIGHTING STANDARDS—**Oakland, Calif.**—W. W. Chappell, city clk., taking bids furnishing Dpt. Electricity with street lighting standards. To exceed $1,000.

SEWER PIPE—**Oakland, Calif.**—W. W. Chappell, city clk., taking bids sewer pipe, lumber, brick and emulsified pre-mix during fiscal year. To exceed $10,000.

†SEWER PIPE, etc.—**New London, Conn.**—June 15, by Con. Q.M., 4 in. sewer pipe, cement, nails, hardware, etc.

†ROCK DRILLS, etc.—**Wash., D. C.**—June 22, by General Purchasing Officer, Panama Canal, pneumatic rock drills, riveting and clipping hammers, pneumatic paving breakers and steels,

Constr. News page 416

†*Federal Government*

Materials, etc. (Continued)
platform scales, c.i. water pipe, gate valves, pig lead, etc., Schedule 3154.

†WIRE ROPE, etc.—**Wash., D. C.**—June 18, by General Purchasing Officer Panama Canal, furnishing wire rope, brass pipe, cast iron, pipe fittings, warehouse trucks, ingot copper monotype metal, bearing metal, phosphor tin, pig tin, antimony, caustic soda, enamel, primer, white and red lead, chrome yellow, metallic brown zinc oxide, spar mixing varnish, turpentine, white ash, Port Oxford, Cedar, Cypress, white pine or sugar pine, maple white oak or poplar lumber, Schedule 3153.

TRUCK—**Evansville, Ind.**—June 26, by Bd. P. Wks., City Hall, ¾ ton light delivery truck, express body, wire enclosed. G. H. Bosse, chn.

SHOP SUPPLIES—**Boston, Mass.**—June 15, by City, A. M. Sullivan, bus. mgr. School Comm., 15 Beacon St., furnishing shop supplies and equipment for Boston Public Schools, general hardware, electrical supplies, steel and angle iron, sheet metal supplies, printing supplies, painting supplies, rope, twine, welding supplies, lead and smelting products, masonry supplies, plumbing supplies, pipe and fittings, radio supplies. To exceed $1,000.

CAST IRON PIPE—**Marlboro, Mass.**—City, Y. L. Brigham, supt. Water & Sewage Comn., City Hall, taking bids 8,100 ft. 6 in. and 6,600 ft. 8 in. Class 150 centrifugal c.i. pipe.

SEWER PIPE—**Worcester, Mass.**—June 17, by City, supt. Sewer Dpt., 20 East Worcester St., J. H. Brooks, supt., vitr. clay sewer pipe. To exceed $1,000.

†PORTLAND CEMENT, etc.—**Duluth, Minn.**—June 16, by U. S. Eng., Canal Park, 2,500 sacks Portland cement, delivery Duluth; and 350 cu.yd. course aggregate, f.o.b. Grand Marais.

†CRAWLER WAGON — **Vicksburg, Miss.** — June 29, by U. S. Eng., Box 667, 8 yard bottom dump crawler wagon, f.o.b. Lake Providence, Louisiana.

†DREDGE PUMP—**Vicksburg, Miss.**—June 18, by U. S. Eng., Post Office Box 667, dredge pump, complete with bed plate and thrust bearing.

†ELECTRIC GENERATING SET—**Vicksburg, Miss.**—June 19, by U. S. Eng., Box 667, steam engine driven, marine type electric generating set, 110 volts, D.C., f.o.b. Vicksburg.

†LUMBER—**Vicksburg, Miss.**—June 24, by U. S. Eng., Vicksburg, furnishing rough cypress lumber.

†ANNEALED STRAND—**Kansas City, Mo.**—June 16, by U. S. Eng., 232 Mfg. Exch. Bldg., 420,000 ft. ¾ in. galvanized annealed strand, f.o.b. shipping point. $5,000.

†ANNEALED STRAND—**Kansas City, Mo.**—June 16, by U. S. Eng., 232 Mfg. Exch. Bldg., 45,000 lb. 2 strand No. 14, galvanized annealed strand. $1,500.

†BOAT SPIKES, etc.—**Kansas City, Mo.**—June 17, by U. S. Eng., 232 Mfg. Exch. Bldg., 40,000 lb. boat spikes and staples, f.o.b. shipping point. $1,700.

†MATTRESS LUMBER—**Omaha, Neb.**—June 17, by U. S. Eng., 819 City Natl. Bank Bldg., 1,000,000 bd.ft. 1x4 in. mattress lumber, $30,000.

†WOOD PILES—**Omaha, Neb.**—June 19, by U. S. Eng., 819 City Natl. Bank Bldg., 5,000 round wood piles from 24 to 68 ft. long, f.o.b. shipping point. $25,000.

TANK—**Johnstown, N. Y.**—H. W. Fear, 112 South Kingsboro Ave., taking bids 1,000 gal. gasoline storage tank for gasoline service station, at North Perry and Canal Sts. To exceed $1,000.

LUMBER, etc.—**New York, N. Y.**—June 15, by Dpt. Purchase, Municipal Bldg., lumber and coffin shooks to Dpts. Parks, Purchase, Water Supply, Gas & Electricity.

TRUCKS—**New York, N. Y.**—June 22, by Dpt. Purchase, R. Forbes, comr. Municipal Bldg., furnishing, delivering trucks to Dpt. Plant & Structures, for support of retractile draw of Borden Ave. Bridge.

STORAGE TANK—**Rensselaer, N. Y.**—Socony Vacuum Oil Co., Inc., 112 State St., Albany, A. J. Waddell, in charge, takings bids 1,000 gal. steel tank for gasoline storage service station, Columbia St. and Aiken Ave. To exceed $1,000.

STEAM SHOVEL—**Springville, N. Y.**—R. L. Wiley, Springville, taking bids furnishing steam shovel for gravel pit operation. $1,000 or more.

†ROLLED STEEL WALL ARMOR, etc.—**Knoxville, Tenn.**—June 17, by Tennessee Valley Authority, Knoxville, furnishing, fabricating, selling, delivering 557,000 lb. rolled steel wall armor; 47,000 lb. anchor straps and 7,000 lb. bolts for Gunthersville Lock. C. H. Garity, dir. Purchases.

†STRUCTURAL STEEL—**Knoxville, Tenn.**—June 19, by Tennessee Valley Authority, Knoxville, furnishing, fabricating, shop painting, galvanizing, delivering miscellaneous structural steel for Gunthersville Lock. C. H. Garity, dir. Purchases.

BOILER EQUIPMENT—**Madison, Wis.**—June 26, by Bd. P. Wks., furnishing boiler equipment for water purification plant.

PIPE—**Milwaukee, Wis.**—C. Whitney, engr., 724 East Mason St., Milwaukee, taking bids 25,000 lin.ft. 8 in. and 40 ft. 3 in. c.i. water pipe for Forest Home Cemetery.

STEEL PONTOONS—**Tracadie, N. B.**—June 18, by Secretary Dpt. P. Wks., Ottawa, Ont., construction and delivery of 20 steel pontoons for suction dredge P.W.D. No. 12. $20,000. K. M. Cameron, Ottawa, Ont., engr.

DRILL, FEEDER, etc.—**Halifax, N. S.**—Government of Nova Scotia in market for mining engineering equipment, one air rock drill with accessories $300, one electrical ore feeder $100, one mechanical ore sampler $350, one air-clarifier $450, one surveying magnetometer $500, one chain-o-matic analytical $175, one Riehle 30,000 ce. capacity universal hydraulic testing machine $1,090, one Westco 2 stage pumping unit complete with 5 hp. motor $375, one diaphragm control valve with pressure controller $320; electrical engineering equipment, one circular dial Toledo scale Model S $165, four 3,500 volt 3MF static condensor unit $240, one time recorder and vacuum tube checker $95, one standard signal generator $741, four resistances variable for communication measurements $14,000; civil engineering equipment, mining transit with telescope $480, auxiliary Engler viscommeter and deck watch $100.

CONTRACTS AWARDED

STEEL PIPE, etc.—**Antioch, Calif.**—J. McElheney, city clk., lap welded steel pipe and fittings and for a suction line and electrically driven centrifugal pump for municipal waterworks pumping plant, to Berkeley Steel Constr. Co., 2nd and Camelia Sts., Berkeley, pipe, incl. basket type fitting, $1,022, ell $49.50. Noted Apr. 22, C. D.—Apr. 23, E. N.-R.

WATER PIPE—**Eureka, Calif.**—City Council, 2,500 lin.ft. 12 in. Class "B" B and S or centrifugal cast iron pipe or equal, guaranteed to stand 150 lb. hydro-static test, delivered f.o.b. dock, to American Cast Iron Pipe Co., Sharon Bldg., San Francisco, $1.70 per ft. Noted May 21, C. D.—May 28, E. N.-R.

AIR COMPRESSOR, etc.—**Los Angeles, Calif.**—H. E. Russell, purch. agt. Los Angeles Co., 524 South Spring St., 1 air compressor, 210 cu.ft. capacity, Spec. 1205, and one air compressor, Spec. 1204, to Smith-Booth-Usher, 2001 Santa Fe. Ave., $1,184 and $2,239 (net) respectively. Bids Apr. 20.

CENTRIFUGAL PUMPS—**Los Angeles, Calif.**—D. P. Nicklin, purch. agt. Dpt. Water & Power, 207 South Bway., two 350 g.p.m. capacity, centrifugal pumps, 350 head, pumps to be horizontal, split case, single suction type. Bid 9711, to Worthington Co., 5075 Santa Fe Ave., $336. Bids May 8. Noted May 5, C. D.

CHAIN SPROCKETS, etc.—**Los Angeles, Calif.**—D. P. Nicklin, purch. agt. Dpt. Water & Power, 207 South Bway., furnishing c.i. or cast steel, bronze, monel metal and stainless steel roller chain sprockets, to Goddard Jackson Co., 1400 Santa Fe Ave., $16,000***Whitney Sprockets, to H. Ledeen, 747 Warehouse St., $2,000***Link Belt sprockets, to Line Belt Co., 365 South Anderson St., $2,000. Grand total $20,000. Bids Apr. 20, awarded May 28. D. P. Nicklin, purch. agt., rejected bids Apr. 20, furnishing Morse or Ramsey silent chain sprockets and Baldwin sprockets. Noted Apr. 15, C.D.

†DOUGLAS FIR POLES—**Los Angeles, Calif.**—U. S. Eng., Forest Service, 751 South Figueroa St., furnishing treated Douglas fir or Southern pine poles, to Texas Creosoting Co., 318 West 9th St., $1,740. Bids Apr. 8, awarded May 26. Noted Apr. 2, C. D.

ELECTRICAL EQUIPMENT, etc.—**Los Angeles, Calif.**—D. P. Nicklin, purch. agt. Dpt. Water & Power, 207 South Bway., furnishing electrical equipment, 2 outdoor type combined coupling capacitators and potential devices, Spec. 1959, to General Electric Co., 5201 Santa Fe Ave., $2,580. Bids May 22, awarded June 2.

PAPER PULLEYS—**Los Angeles, Calif.**—D. P. Nicklin, purch. agt., Dpt. Water & Power, 207 South Bway., furnishing Rockwood type paper pulleys, as required, for 1 year period from date of contract, Spec. 1951, to Quality Electric Co., 812 South San Pedro St., $23,000. Bids May 15, awarded May 28.

PRESSURE TREATED POLES—**Los Angeles, Calif.**—D. P. Nicklin, purch. agt. Dpt. Water & Power, 207 South Bway., furnishing D.F. or S.Y.P. pressure treated poles, Spec. 1965, to J. H. Baxter Co., 601 West 5th St., $6,556. Bids May 21, awarded May 28.

PUMPS—**Los Angeles, Calif.**—D. P. Nicklin, purch. agt. Dpt. Water & Power, 207 South Bway., furnishing pumps for use with refined oil, hot oil, caustic soda solution cracking stock, cycle stock, gasoline and fuel oil, Spec. 1948, to Ingersoll Rand Co., 1460 East 4th St., $4,590. Bids Apr. 27, awarded May 28. Noted Apr. 24, C.D.

†*Federal Government*

Constr. News page 417

BETTER PERFORMANCE ON THE JOB!

"BOSS" HOSE COUPLINGS

Used for steam hose, steam hammers, air hydraulic or road builders' hose . . . "Boss" Couplings have no equal for dependability in service. Parts are of steel or malleable iron to withstand abuse . . . Cadmium Plated for rust-proofing.

Furnished In Washer or Ground Joint Type.

"DIXON" AIR HAMMER COUPLINGS

Designed and built to withstand the continual vibration of hand hammers and rock drills, this Dixon coupling has a longer, consistently economical service life on the toughest job. And, like the "Boss," it is rust-proofed by Cadmium Plating.

Furnished In Washer or Ground Joint Type.

Carried in stock by leading Rubber Manufacturers and Jobbers.

DIXON
VALVE & COUPLING CO.
PHILADELPHIA
LOS ANGELES HOUSTON

Ransome

LINE YOUR TUNNEL

with RANSOME Pneumatic Placers and Grouters

▼

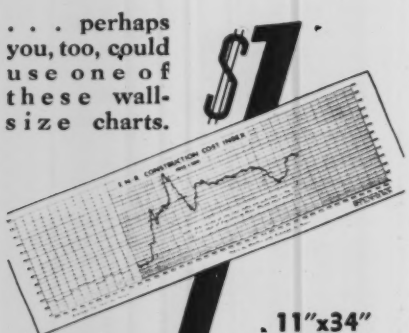
Building Mixers
Paving Mixers
Tower & Chuting Plants
Tunnel Forms

Ransome Concrete Machinery Company
Dunellen, New Jersey
Cable Address "Racomaco-Dunellen"

Enlarged by Request!

ENGINEERING NEWS-RECORD
Construction Cost Index

. . . perhaps you, too, could use one of these wall-size charts.



1903 to 1913 by years; 1913 to date by months.

$1 . 11"x34" .00 per copy

Ideal for conference room walls and for court use.

Send orders to Const. News Dept.
Engineering News-Record, 330 W. 42d St., N. Y.

Materials, etc. (Continued)

REGISTERS—**Los Angeles, Calif.**—D. P. Nicklin, purch. agt, Dpt. Water & Power, furnishing maximum demand register, Spec. 1954, to Sangamo Electric Co., 417 South Hill St., $3,695. Bids May 15, awarded May 28. Noted May 8, C.D.

RUBBER COMPOUND—**Los Angeles, Calif.**—D. P. Nicklin, purch. agt., Dpt. Water & Power, 207 South Bway., 16,115 ft. performance rubber compound insulated wire and cable, Spec. 1941, to General Cable Co., 3600 Mines Ave., $3,755. Bids May 4, awarded May 28.

SHAPER, AIR COMPRESSOR, etc.—**Los Angeles, Calif.**—City, A. Eldredge, genl. mgr., City Hall, furnishing one new 28 in. machine shop shaper, embodying all latest improvements, powered by own motor, to Harron Rickard & McCone, 2205 Santa Fe Ave., $3,165***one new stationary air compressor, to Gardner-Denver Co., 845 East 61st St., $2,530***one new 12 in. engine lathe, to Smith-Booth-Usher Co., 2001 Santa Fe Ave., $2,920. Grand total $8,615. Bids May 13, awarded May 27. Noted May 6, C. D.

SKIP LOADERS—**Los Angeles, Calif.**—A. J. Holm, city purch. agt., City Hall, 3 each Hough or equal hydraulic skip loaders, complete, tractor mounted, Spec. 3485, to Brown-Bevis Equipment Co., 4900 Santa Fe Ave., Vernon, $6,699. Bids Apr. 13. Noted Apr. 20, C.D.

†STEEL BARS—**Los Angeles, Calif.**—Indian Irrigation service, 751 South Figueroa St., furnishing rein.-con. bars, concrete Type B def. grade 2, intermediate billet steel, either Class A open hearth or B Bessemer, to Concrete Eng. Co., 1450 Mirasol St., $701. Bids May 25, awarded May 29. Noted June 1, C. D.

SWITCH RACK—**Los Angeles, Calif.**—Dpt. Water & Power, 207 South Bway., D. P. Nicklin, purch. agt., furnishing structural steel switch rack, Spec. 1960, to Emsco Derrick & Equipment Co., 6800 South Alameda St., $4,390 without bolts. Bids May 18, awarded May 28.

TIME SWITCHES—**Los Angeles, Calif.**—D. P. Nicklin, purch. agt., Dpt. Water & Power, 207 South Bway., May 25, 200 time switches, Spec. 1968, to Automatic Electric Mfg. Co., Mankato, Minn., $1,800. Bids May 25. Noted May 15, C.D.

VIBRATING SCREEN—**Los Angeles, Calif.**—A. J. Holm, city purch. agt., City Hall, 1 horizontal vibrating screen, f.o.b. Los Angeles, Spec. 3487, to Cutting Eng. Wks., 2035 East 38th St., Vernon, $2,980. Bids Apr. 14. Noted Apr. 20, C.D.

WIRE—**Los Angeles, Calif.**—D. P. Nicklin, purch. agt., Dpt. Water & Power, 207 South Bway., 31,680 ft. overhead ground wire for Boulder Dam transmission line, Spec. 1962, to Copperweld Steel Co., San Francisco, $2,935. Bids May 26, C.D., awarded May 28. Noted May 20, C.D.

GATE VALVES—**San Francisco, Calif.**—T. A. Brooks, city purch. agt., three 48 in. gate valves, to Ludlow Mfg. Co., Los Angeles, $5,881; two 36 in. gate valves, to Chapman Valve Mfg. Co., 508 4th St., $1,399. Bids Apr. 13. Noted Apr. 2, C. D.

★ †SCREW HOPPER DREDGE — **San Francisco, Calif.**—U. S. Eng., Custom House, hopper dredge, to Bethlehem Shipbuilding Corp., 20th and Illinois Sts., $647,000. Bids Apr. 28. Noted May 5, C. D.

PUMP—**Pueblo, Colo.**—Water Dist. 2, 119 West Abriendo Ave., 400 hp. Allis-Chalmers electric motor and turbine pump, to Harris Equipment Co., Pueblo. Awarded June 2.

METAL PIPE, etc.—**Princeton, Ill.**—Bureau Co. Hy. Dpt., to Klauer Mfg. Co., 9th and Washington Sts., Dubuque, Ia., 296 lin.ft. 15 in. corrugated metal pipe at 72c; 18 in. at 86c; 21 in. at 99c***to Rice & Woods, Tishihua, 1,132 ft. 12 in. precast concrete pipe, 68c; 15 in. at 78c; 18 in. at 98c.; and 20 in. at $1.39***to Western Sand & Gravel Co., Spring Valley, 274 cu.yd. fine aggregate, $1.35 per cu.yd.; 410 cu.yd. coarse aggregate at $1.45 per cu.yd.***to Kewanee Lumber Co., Kewanee, 688 bbl. portland cement at $2.08 per bbl. net***to M. Bryant, Depue, 188 bbl. portland cement, $1.96 per bbl. net***to Concrete Steel Co., 310 South Central Park Ave., Chicago, 46,240 lb. reinforcing steel at $2.30 per cwt.***to Contractors Material Co., Peoria, 18,570 lb. reinforcing steel at $2.35 per cwt., all for use on Sect. HA-15d and Sect. 19-2MFT. Bids May 15. Noted May 14, C. D.

DOUGLAS FIR, etc.—**Glenwood, Ia.**—Mills Co., E. A. Schade, co. aud., 16,667 ft. B.M. creosoted Douglas fir or yellow pine lumber, 36,000 ft. B.M. Class D Douglas fir lumber, 28,000 ft. B.M. Class A Douglas fir lumber, 10,667 ft. B.M. Class C fir lumber and 2,325 lin.ft. creosoted yellow pine piling, to Nebraska Bridge & Supply Co., 730 Union State Bank Bldg., Omaha, Neb., $5,867. Bids June 10 cancelled. Noted May 27, C. D.—June 4, E. N.-R.

CULVERT PIPE—**Oskaloosa, Ia.**—Mahaska Co., B. E. Evans, aud., 3,700 lin.ft. corrugated metal culvert pipe, to J. A. Rosenbaum & Sons, Centerville, $3,023. Bids May 27.

LUMBER, etc.—**Sidney, Ia.**—Fremont Co., E. E. Cowden, aud., 79,080 ft. BM lumber and 2,125 lin.ft. piling, to National Bridge Materials Co., 713 Union State Bank Bldg., Omaha, Neb., $4,616***to Wheeler Lumber, Bridge & Supply Co., 606 Hubbell Bldg., Des Moines, $4,672***to Platte Overton, Council Bluffs, $4,708***to Central State Bridge Supply Co., Fort Madison, $4,710. Grand total $17,700. Bids May 25. Noted May 21, C. D.

CULVERT PIPE—**Webster City, Ia.**—Hamilton Co., 6,840 lin.ft. concrete culvert pipe, to Wilson Concrete Co., Humbolt, $6,498. Bids May 27. Noted May 25, C. D.

ACTIVATED CARBON—**Baltimore, Md.**—City Bureau Water Supply, Municipal Bldg., furnishing, delivering activated carbon to Bureau Water Supply, to Industrial Chemical Sales Co., 230 Park Ave., New York, and to Cliffs Dow Chemical Co., Marquette, Mich., $4,125. Bids May 13. Noted May 19, C. D.

ROAD OIL, etc.—**Clayton, Mo.**—St. Louis Co., Court House, to Missouri Petroleum Products Co., Ladue Rd. and Terminal tracks, Clayton, 750,000 gal. more or less road oil, St. L. Co. Prime 1 Road Oil No. 2 and 3, 4.95c. per gal.; MC 1, 2, 3, 4 and 5 at 6.94c. per gal.; RC 1, 2, 3 and 4 at 7.44c. per gal.***to Rock Hill Asphalt & Constr. Co., Ladue Rd., 30,000 gal. asphalt at 11.2c. per gal. Bids Feb. 26. Noted Feb. 18, C. D.—Feb. 20, E. N.-R.

ROAD ROLLERS, etc. — **Clayton, Mo.** — St. Louis Co., Court House, to O. B. Avery Co., 1325 Mackland Ave., St. Louis, two 7 ton road rollers, $7,680 net***to J. Fabik Tractor Co., 2812 Iowa Ave., St. Louis, 2 caterpillars and graders, $1,480 net***to Reller Chevrolet Co., 7239 Manchester Ave., Maplewood, 1 Chevrolet cab, 1½ ton dump body, with hydraulic hoist and 1 Chevrolet cab and chassis with dual wheels at $1,525 net. Grand total $10,685. Bids Apr. 15. Noted Apr. 13, C. D.

STONE, etc.—**Clayton, Mo.**—St. Louis Co., Court House, to Big Bend Quarry Co., Wall and Lucas Rds., stone and gravel in Dists. 3 and 5 at $1.80 per ton and $1.95 per ton respectively***to Vigus Quarry & Material Co., 4831 Parker St., St. Louis, $1.75 per ton in Dists. 2 and 6***to Bottom Quarry, Riverview Dr. and Strodtman Rd., Route 15, Baden Station at $1.75 per ton in Dist. 1***to Rock Hill Stone & Gravel Co., 1233 North Road Hill Rd., Webster Groves, $1.65 per ton in Dists. 4, 5 and 7***to F. Ruprecht Quarry Co., Paule Ave., Luxemburg, $2 per ton in Dist. 9***to Bussen Quarries, Inc., Jefferson Barracks, $2 per ton in Dist. 10. Bids Apr. 8. Noted Mar. 30, C. D.—Apr. 2, E. N.-R.

CRUSHED STONE — **Albany, N. Y.** — J. E. Sheary, ch. aud., Dpt. P. Wks., State Office Bldg., Albany, 1,000 tons No. 1 and 2,200 tons No. 2 stone, delivered on Hy. 8428 near Wells, Warren Co., to Crushed Rock Products, Inc., Maxon Rd., Schenectady, $2.60 per ton, total $8,320***650 tons stone, delivery Hy. 9071, Kennedy, to Federal Crushed Stone Corp., Elliott Sq. Bldg., Buffalo, $2.52 per bbl., total $1,638***500 tons stone, delivery Hy. 8044, Stafford, and 1,000 tons stone, delivery Hys. 8032 and 8033, Portland, to Genesee Stone Products Corp., Box 98, Batavia, $2.25 and $2.10 per ton respectively, total $1,125 and $2,100 respectively. Grand total $13,186.

†LUMBER, etc.—**Binghamton, N. Y.**—P. Wks. Administration, Procurement Div., Telephone Bldg., lumber for athletic field in Greene (Village of Greene, owner), to Pratt Lumber Co., 35 Jarvis St.***150 bbl. cement for project in Oneonta (City of Oneonta, owner), to South Side Coal Co., South Aurora St., Ithaca***1,454 ft. sewer pipe for sewer in Cooperstown (Village of Cooperstown, owner), to Brick & Tile Corp., 232 Fulton St., New York***dynamite for Peas Eddy Rd., Hancock (Village of Hancock, owner), to Waid Explosive Sales Co., Worcester. Work by relief labor. **W.P.A.**

BITUMINOUS MATERIAL—**Syracuse, N. Y.**—Bd. Supervs., Onondaga Co., 15,000 gal. bituminous material for repairing highways in county parks, to Barrett Co., State Fair Blvd., $1,650.

TRUCKS—**Yonkers, N. Y.**—Bd. Contr., City Hall, 5 four-wheel drive trucks for Public Works Dpt., to Four Wheel Drive Co., Clintonville, Wis., $34,740. Bids May 7. Noted May 1, C.D.

DIAPHRAGM PUMPS, etc.—**Raleigh, N. C.**—Div. Purchase & Contr., S. Brower, dir., to E. F. Craven, Greensboro, furnishing three 4 in. diaphragm pumps equipped with gas engine of approximately 2 hp. and with 20 ft. 4 in. water suction hose, $600; 1 medium duty hoist unit with double drum, silent chain transmission, 20 hp. radiator cooled, 4 cylinder motor enclosed in metal housing, mounted on steel channels, $660***to Kohler Co., 120 West Grace St., Richmond, Va., 6 generator units, $1,693***to Dillon Supply Co., 216 South West St., three 7-S (AGC Standard), one bag non-tilting concrete mixers, $2,229***to American Hardware & Equipment Co., 217 West 1st St., Charlotte, 1,500 road machine blades, $2,707***to F. H. Ross & Co., Inc., 224 West 2nd St., Charlotte, 1 minimum car (20 tons), calcium or sodium chloride, $530***to Sinclair Refining Co., 630 5th Ave., New York, one hundred and sixty 100 lb. steel drums lubricant, No. 00, and nine hundred and sixty 25 lb. tins or pails pressure gun grease, $738***to Job P. Wyatt Co., 325 South Wilmington St., 800 road machine and 500 drag blades, $2,665***

Constr. News page 418

†Federal Government

Materials, etc. (Continued)

to Pullman-Standard Car Mfg. Co., Webb-Crawford Bldg., Birmingham, Ala., 1,200 road machine blades and drag blades, $1,887***to Rickman Brick Co., Lillington, 124,000 brick, $1,736***to Mount Gilead Brick Co., Mt. Gilead, 265,200 brick, $3,712***to Salem Steel Co., Winston-Salem, 38,500 lb. structural and 1,806 lb. reinforcing steel, $1,373***to Monroe Hardware Co., Monroe, 350 dozen hollow back, long and short handled shovels, $4,655***to Wood Preserving Corp., Up King St., Charleston, S. C., 3,898 creosoted lumber, 16 pieces triangular lumber, $1,076; 250 pcs. creosoted timber, $1,458; 10,460 bd.ft. creosoted timber and 480 lin.ft. creosoted timber piles, f.o.b. Littleton, $929***to Gulf States Creosoting Co., Piedmont Bldg., Charlotte, 100 creosoted timber piles, 25 ft. long, f.o.b. Greensboro, $1,150; 400 creosoted timber piles, $4,500; 150 creosoted timber piles, $1,988. Grand total $36,286. Bids May 21. Div. Purchase & Contr. rejected bids May 21, furnishing 1 air compressor, 2 stage air or water cooled, 105 cu.ft. per minute. Noted May 18 and 20, C. D.

TRACTORS and PATROLS—**North Dakota**—State Hy. Dpt., Bismarck, furnishing three tractors and one motor patrol, to Dakota Tractor & Equipment Co., Fargo, $20,408***two tractors and one motor patrol and one center line striper, to Lewis Tractor & Mchy. Co., Fargo, $16,154***four motor patrols and metal culverts, to Northwestern Sheet & Iron Wks., Wahpeton, $20,836***two motor patrols, to Midwest Equipment & Culvert Co., Fargo, $8,817***one motor patrol, to J. D. Adams Co., 217 South Belmont Ave., Indianapolis, Ind., $4,529***one motor patrol, to North Dakota Metal Culvert Co., Fargo, $3,750. Grand total $74,494. Noted May 4, C. D.—May 7, E. N.-R.

†AGGREGATES—**Knoxville, Tenn.**—Tennessee Valley Authority, Knoxville, 450,000 tons aggregates, to American Aggregate Corp., Greenville, O., $240,400. Bids Mar. 27 and Mar. 6, C. D.—Mar. 12, E. N.-R.

†DRAGLINE, etc.—**Memphis, Tenn.**—U. S. Eng., P. O. Box 97, Memphis, one dragline and full operating crew, 3 tractors with wagons and drivers, 1 tractor with bulldozer and driver and light plant complete with wiring and bulbs, Unit 1 and dragline and full operating crew and 3 tractors with wagons and drivers, Unit 2, to Driver Co., 62 South Front St., $20,790 and $17,640 respectively. Bids Apr. 6. Noted Mar. 31, C. D.

GRADER—**Yakima, Wash.**—City, City Hall, furnishing 22,000 lb. street grader with 54 hp. Diesel engine and 12 ft. blade, to Rankin Implement Co., Yakima, $5,836. Bids May 26.

STONE, etc. — **Appleton, Wis.** — Outagamie Co., 500 cu.yd. keystone, to G. A. Kline Stone Co., Kaukauna, at $1.50 per cu.yd.; two 8,000 gal. tank cars tar, to Barrett Co., 2800 South Sac Ave., Chicago, Ill., 10.04c. per gal.

SEWER PIPE—**Lake, Wis.**—Town, furnishing 452 lin.ft. 30 in. rein.-con. sewer pipe, to Schneider Fuel & Supply Co., 3438 Forest Home Ave., Milwaukee, at $2.90 per ft. Bids May 27, awarded May 27. F. P. Schade, Cudahy, engr.

†SAND, GRAVEL, etc.—**Madison, Wis.**—Treas. Dpt., Procurement Div., Madison, to Ische Sand & Gravel Co., Green Bay Ave., and Silver Spring Dr., 500 cu.yd. sand at $1.30 per ton; 7 tons sand at $1.18 per ton***to F. A. Pipkorn Co., 2941 North Humboldt Ave., 435 tons washed torpedo sand for county institutions, Milwaukee, at $1.18 per ton***to W. H. Pipkorn Co., 1548 West Bruce St., 900 tons torpedo sand Class A, Grade A, $1.18 per ton***to Cities Fuel & Supply Co., 6639 West National Ave., 7,500 cu.yd. gravel for backfilling, $1.30; 600 tons torpedo sand, $1.18 per ton***to Kohler Bros. Sand & Gravel Co., Route 4, West Allis, Milwaukee, 500 tons sand for concrete, $1.18***to Central Sand & Gravel Co., West Chestnut St. and Lower Lane Rd., Milwaukee, 1,250 bbl. cement in paper bags, $2.50***to Schneider Fuel & Supply Co., 3438 West Forest Home Ave., Milwaukee, 175 bbl. Portland cement, $2.50***to Berthelet Pipe & Supply Co., 820 West Montana St., Milwaukee, 2,725 bbl. Portland cement in paper bags, $2.50 ***to Tews Lime & Cement Co., 1136 East North Ave., Milwaukee, 1,000 tons sand, fine aggregate, $1.18 per ton***to R. A. Smith, Wauwatosa, 600 tons keying gravel at $1.25; 580 tons sand, fine aggregate at $1.18***to North Lake Sand & Gravel Co., 342 North Water St., Milwaukee, 1,100 tons covering sand, $1.18 per ton.

FERRIC CHLORIDE — **Milwaukee, Wis.** — Sewerage Comn., furnishing about 3,000 tons ferric chloride, to Pennsylvania Salt Mfg. Co., Widener Bldg., Phila., Pa., at $1.65 cwt. Noted May 12, C. D.—May 14, E. N.-R.

†WIRE TEES, etc.—**Milwaukee, Wis.**—U. S. Eng., 40,000 wire tees, to J. P. Curry Mfg. Co., Stamford, Conn., $2,940; 12,096 ft. tarred felt, to Johns Mansville Sales Corp., 757 North Bway., Milwaukee, $41. Bids May 25, awarded May 26. Noted May 25, C. D.

SEWER PIPE—**Wausau, Wis.**—City, furnishing 3,705 ft. 8 in. and 1,700 ft. 10 in. vitr. clay sewer pipe, to Nickel Hardware Co., Wausau, $1,060. Bids May 4.

GRAVEL—**Elma Twp., Ont.**—Elma Twp., crushing and hauling 4,500 yds. gravel, to Wm. Yundt, 122 St. Vincent St., Stratford, at 55c. per yd., total est. $2,500.

ROAD OIL—**Toronto, Ont.**—York Twp. supply and application of road oil, to Municipal Road Spraying & Oiling Co. Ltd., 225 Sterling Rd. Est. exceeds $2,000.

DUST MACHINE—**Quebec City, Que.**—Municipality, supplying, installing dust elimination machine at city asphalt plant, to J. A. Bouchard & Co., Quebec, $5,100.

FOREIGN

Australia—S. E. Travill, town clk., **Brisbane**, taking bids supplying traction sub-station equipment, incl. high tension switchgear, instruments and supervisory control***Ministry of Postmaster General, **Sydney**, interested in prices of relay sets***June 24, by Chief Electrical Engineer, New South Wales Government Railway, 19 York St., **Sydney**, supplying and erecting water tube boiler with all accessories at Lightgow Station, July 8, supplying, erecting of steam pressure reducing and desuperheater equipment for White Bay Station***Sydney City Clerk, taking bids supplying, delivering 11,000 volt oil immersed isolating and earthing switches***H. Sadler, ch. storekeeper, Government Stores Department, Harrington St., **Sydney**, interested in prices of 2 marine compression ignitions engines***Ministry of Postmaster General, **Sydney**, supplying automatic switchboard equipment to British General Electric Co., Ltd., P.O. Box 1594, Sydney, $689,592 ***New South Wales Government Railways, **Sydney**, supplying 10,000 kva. transformer, single phase reactors and one 1,000 series transformer to Electrical Plant Manufacturing Ltd., Botany St., Rosebery, $21,687***E. C. H. Henderson, principal designing archt., New South Wales Government, **Sydney**, plans broadcasting stations at Sydney and at Melbourne, $500,000***L. J. Buckland, 26 O'Connell St., **Sydney**, taking bids erecting electrical substation complete with ducts, equipment, transmission and distribution lines at Kogarah for St. George County Council***American Smelting & Refining Co., Ltd., **Cue**, making plans constructing mill capable of treating 25,000 tons of ore a month, also for constructing 20 mi. railroad. Plans ready July, 1936. D. D. Pitt, mgr.***July 15, by W. H. Newman, secy. Department Railway, 19 York St., **Sydney**, supplying, erecting one 25,000 kva. frequency changer and accessories for White Bay Station.

Australia, Sydney—Compton, Parkinson Ltd., Chelmsford, England, purchase site and plans plant, (1,000,000 sq.ft. floor space) for manufacturing electric globes, $750,000. Will purchase automatic machinery.

China—Whangpoo Conservancy Commissioners invited tenders for supply of 2 steel pontoons for grab dredges and for constructing and supplying center well drag suction type seagoing hopper dredge***Chengtu-Chungking Railway, **Szechwan**, invites tenders for constructing railway, $48,000,000. Will purchase $20,000,000 of materials***Chinese Ministry of Railways, **Lunghai**, votes $3,000,000 for constructing steel bridge across the Yellow River at Tungkwan, 1 kilometer long***Chinese Ministry of Justice, **Nanking**, plans prison, $1,200,000 voted***Tienstin Tram Co., **Tienstin**, plans reconstructing system at $1,000,000***Ministry of Chinese Railway, **Hanlow**, plans lumber mill and chemical processing plant, $700,000*** Chinese Ministry of Railways, **Kiangsi**, plans constructing railway between Manchang and Pingsiange, $18,000,000***Peiping - Suiyuan Railway, **Pieping**, plans for 110 mi. extension between Paotou and Wuyuan***Nanking Municipality plans extending municipal railway to Wuhn, $500,000.

China, Honkong—Harry Wicking & Co. Ltd., Prince's Bldg., Ice House St., in market for initial supply 50 tons new mild steel plate cuttings, approximately rectangular with straight edges, sheared on 4 sides, laminated, blistered, butted or burnt plates, not acceptable. Custom duty—Nie.

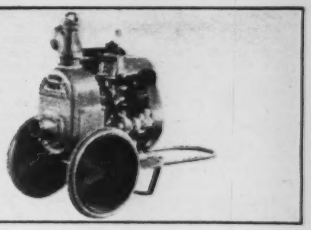
China, Shanghai—South Manchuria Railway Co. prepares plans reconstructing wharf and replacing with rein.-con. structures. $500,000.

England—Borough Council of Rowley Regis, making plans 560 house construction, **Old Hill**, $1,220,000***Nottingham Municipality commissions Vincent Harris, 29 St. James Sq., London, to prepare plans for county hall and offices, at Trent Bridge, $1,000,000***Robert Brett & Sons, Ltd., **Canterbury**, in market for 30 ton road weighbridge***F. Watkins Co., **Coleford**, in market for 2 vertical cross tube, boilers, 2 Lancashire boilers, and 3 Cochran boilers*** Nottinghamshire County Council, **Balderston**, making plans new mental colony, voted $1,199,740, plans ready in July***E. W. Scorer, clk., Lincolnshire Joint Board for Mentally Defective, **Lincoln**, invited applications from firms desirous of bidding on new construction, G. G. Phillips, Queens Chambers, King St., Nottingham, engr. ***Israel Newton & Sons, Ltd., Summerley Wks., plans iron masters plant and foundry, etc., **Bradford**, $500,000***Bloomfield Co., Debenham, in market for chain morticing machine, **Stowmarket*****Paxton Co., **Kendal**, in market for turning machine***Ward & Co., 360 Canterbury St., **Gillingham**, in market for combined chain and hollow chisel morticer***William Nixon, engr., **Brampton**, in market for band saw and planer***B. and F. Carter Co., Ltd., Whitehall St., **Rochdale**, purchases 2 acres at Bolton, for new $600,000 plant for manufacturing braiding, plaiting and cable making machinery.

Constr. News page 419

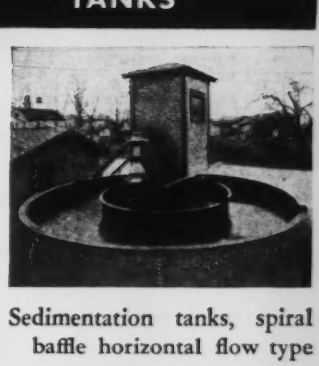
†*Federal Government*

LOWER PRICE—LIGHTER WEIGHT
POSITIVE RECIRCULATION CUT-OFF



NEW
REX 2" and 3" MODELS
7,000 AND 15,000 G.P.H.
REX SPEED PRIME
PUMPS—2" TO 6"
7,000 TO 90,000 G.P.H.
Send Today for Bulletin No. 276
CHAIN BELT COMPANY
1633 W. Bruce Street, Milwaukee, Wis.
REX *Construction Equipment*

WATER TREATING TANKS



Sedimentation tanks, spiral baffle horizontal flow type
Sedimentation tanks, vertical flow type
Wash water tanks
Filter tanks
Clear well tanks
All of steel plate construction
Pittsburgh DES MOINES STEEL COMPANY
3414 Neville Island, Pittsburgh
915 Tuttle St., Des Moines

Foreign (Continued)

England—Universal Grinding Wheel Co. Ltd., **Stafford**, in market for 70 kw. gasoline driven alternator set, 400 volts, 3 phase, 50 cycle••• Brynecthin Brickworks Ltd., **Bridgend**, in market for meggerchmeter up to 500 volts, also volt meter, 500 volts.

England, London—Chinese Government Purchasing Commission, c/o Fox & Mayo, 155 Dashwood House, Old Broad Street East, in market for twelve 10 in. c.i. water columns with crane with spring loaded relief valves and also for 10 in. c.i. flanged pipes and fittings; British Central Electric Co. Ltd., 8 Roseberry Ave. East, in market for 200 kw. rotary converter with transformer, input 6,600 volts, 3 phase, 50 cycle, output 220 volts d/c a 200/250 kw. rotary converter, input 5,500 volts, 3 phase, 50 cycle, output 460 volts d/c and 350 kva. transformer, primary 6,600 volts, secondary 2,750 volts, 3 phase, 50 cycles.

England, West Bromwich—F. Willis & Co. Ltd., Hall St. Works, in market for surplus stocks of black and galvanized steel sheets, also round flat and square bars, strip and wire.

India, Simla—Director of Contracts, Army Headquarters in market for 50,000 lb. boric acid commercial quality.

Japan—Ministry of Railways, Y. Malda, **Tokyo**, announces plans for constructing Kwannon Straits Tunnel, linking Shimonoseki with Mozi, est. Y8,000,000. **maturity this year••• Tokyo** Overseas Ministry plans enlarging transportation facilities, develop power and natural resources in Saghalien, $20,000,000 initial cost •••**Yokohama** Municipality making plans industrial hall, Y450,000•••Yawata, Japan Iron Mfg. Co. making plans 1,000 ton smelter in addition to one now under construction, Y7,000,000.

Japan, Fukushima—Showa Rayon Factory plans reconstructing plant at estimated cost of Y 6,000,000.

Manchukuo, Hsinching — Directorate General of Manchukuo State Railways, plans constructing 3,000 kilometers net of National Defence Railways.

Manchukuo, Mukden—Manchuria Pulp Industrial Co. making plans plant, $1,000,000; East Manchuria Pulp Mfg. Co., plans by own engineer for plant, $750,000; Japanese-Manchukua Joint Pulp Mfg. Co. making plans plant, $1,000,000; Oriental Pump Mfg. Co. takes bids in July for new plant.

Norway, Oslo—Government preparing plans smelting plant at Glomford, for rolling mill at Oslo, for power development, 90,000 kw. at Glomford, $15,000,000; also constructing plant at Grong, incl. grinding mills, transporters, copper smelting and wharves, kr. 20,000,000, about $5,000,000.

Scotland—Ross's Dairy Ltd., 572 Dunbarton Rd., **Glasgow**, plans by F. Pilsie, Library Bldg., Wallace Square, Greenock, for creamery and other works and offices, at Partick, $600,000 •••Alston Hewat, 167 St. Vincent St., **Glasgow**, in market for Lancashire boiler•••T. Scott Sutherland, **Aberdeen**, preparing plans for flat for Plans & Town Planning Committee, $600,000•••D. Robertson, city clk., **Edinburgh**, invites tenders for constructing 2 steam generating units, E. Seddon, Dewer Pl., Edinburgh, engr.•••A. Skinner, engr., **Maud**, in market for 110 volt 150 amp. compound dynamo with regulator.

Wales—E. C. Jordon & Co., **Newport**, plans by Vaugh & Richards, Newport, housing on 132 acre site, $1,250,000•••Thomas Co., Rockway Saw Mills Crocket Station Sidings, **Swansea**, in market for 40 in. grinding machine for shearing and sliding knives, one vertical cross tube boiler, 8½ in. x 4 ft., also for 10 ton overhead traveling gantry crane, 30 ft. span••• Swansea Brickworks Co. Ltd., Forestfach, **Swansea**, in market for two 50 hp. a/c slip ring motors, 400 volts, 50 cycle, 3 phase, 720 r.p.m. complete with starters.

PUBLIC BUILDINGS

PROPOSED WORK

Calif., Los Angeles—Bd. Educ., Chamber of Commerce Bldg., plans by A. C. Zimmerman, 354 South Spring St., two 2 story, 63x545 ft. and 61x123 ft., rein.-con., steel school buildings at Central Junior High School, 461 North Hill St., $400,000. Applied for building permit.

Conn., Stonington — Town, Bd. Selectmen, plans brick, steel Senior Junior High School in Pawcatuck, $140,000. Architect not appointed.

†Fla., Miami—Treas. Dpt. at office Sup. Archt., Wash., D. C., rejected bids Jan. 9, constructing U. S. Coast Guard Air Station. Noted Jan. 9, C. D.—Dec. 26, E. N.-R.

†Ill., Lemont — Treas. Dpt. at office Sup. Archt., Wash., D. C., rejected bids May 22, constructing U. S. Post Office. Noted May 26, C. D.—Apr. 30, E. N.-R.

La., Baton Rouge—Louisiana University plans by Weiss, Dreyfous & Seiferth, Maison Blanche Bldg., New Orleans, 3 story, basement, law school building, Est. $250,000.

Me., Lewiston—City, H. N. Paradis, police comr., City Hall, plans by Coombs & Harriman, 11 Lisbon St., 2 story, basement, 100x100 ft., brick, steel police station, concrete found., Park St. Est. about $140,000.

Constr. News page 420

†Mass., North Truro—P. Wks. Officer, Navy Dpt., Boston, received no bids June 2, constructing barracks and garage, at Naval Direction Finder Station. Noted May 25, C. D.—May 28, E. N.-R.

†Neb., Minden—Treas. Dpt. at office Sup Archt., Wash., D. C., rejected bids May 12, constructing U. S. Post Office. Noted May 14, C. D. —Apr. 23, E. N.-R.

†N. M., Portales—Treas. Dpt. at office Sup. Archt., Wash., D. C., received no bids June 3, constructing U. S. Post Office. Noted May 6, C. D.—May 14, E. N.-R.

★**N. Y., Binghamton**—City, C. A. Harrel, city mgr., City Hall, preliminary plans constructing new building for private patients, Mitchell Ave., $477,000; corridor building, $50,280; internes quarters on roof of operating room, $31,200; remodeling 1st floor Park Ave. building, $33,200; equipment to cost $50,000; landscaping, filling and grading, $5,000. Total est. $650,000. Architect and engineer not appointed.

N. Y., Dobbs Ferry—Bd. Educ., Dobbs Ferry, plans installing new sanitary heating facilities in old elementary school, incl. moving piping, etc., from basement to 1st floor, and connecting heating system with new high school boiler facilities, H. B. Guillan, Oliphant Ave., engr.

N. Y., Jamestown—City, Bd. Public Utilities, City Hall, authorized C. O. Johnson, supt., to hire Peter Luftus, Inc., consult. engr., Grant Bldg., Pittsburgh, Pa., to prepare final plans and specifications for furnishing, installing new turbo-generator, with 12,500 kw. minimum at Steel Street plant of municipal electric system, $475,000. Bids in July.

N. Y., Saranac Lake—Village to hold popular referendum on proposal to construct light and power plant and distribution system, $478,000. Will apply for P.W.A. loan. Burns & McDonnell, 11 North Pearl St., Albany, consult. engrs. Noted Jan. 26, C. D.—Jan. 30, E. N.-R.

N. Y., Utica — City, City Hall, plans constructing large brick, steel municipal garage, plain found. $120,000-$150,000. Site not selected.

†N. C., Rockingham—Resettlement Administration, Wash., D. C., $5,000 has been appropriated for preliminary work on industrial project on 5,000 acre tract adjacent to 14 mills in section of Rockingham, to provide tracts for mill workers. Total $250,000. H. Mask, Dixie Bldg., Raleigh, dir. for North Carolina.

★**N. C., Wilmington**—New Hanover Co., Bd. Educ., R. Funderburk, supt., and Dr. J. T. Hoggard, chn. Bd., filed application to P.W.A. for loan and grant to finance construction schools. $510,909.

O., Berea—W. C. Kammerer & Associates, 823 Prospect Ave., Cleveland, have been appointed to make survey and report of needed improvements to municipal light plant, for City. Noted May 4, C. D.—Mar. 14, E. N.-R.

S. D., Sisseton—Bd. Educ. plans grade and high school, $150,000. Architect not appointed.

Tex., Floydada—City, c/o Secretary, voted $120,000 bonds for municipal electric power plant.

Tex., Fort Worth—Bd. Educ., c/o E. P. Williams, bus. mgr., 409 East Weatherford St., new bids about July on revised plans 3 story, basement, 127x420 ft., brick, rein.-con., Polytechnic Senior High School, gymnasium, auditorium, etc., Avenue E and East Rosedale Sts., $462,000. J. R. Pelich, 1103 Trinity Life Bldg., archt. Noted Apr. 7, C.D.—Apr. 9, E.N.-R.

Tex., Lockhart—City surveys in progress new power plant. Burns & McDonnell, 107 West Linwood Blvd., Kansas City, Mo., engrs.

Utah, Logan—Bd. Educ. rejected bids May 26, additions and repairs to three city school buildings, $35,000. Schedule 4 of city's $215,000 P.W.A. school building program. Will readvertise. Noted May 20, C. D.

†Utah, Provo—Treas. Dpt. at office Sup. Archt., Wash., D. C., takes bids within next 30 days, constructing federal building. $225,000.

Que., Quebec City—Hon. Edgar Rochette, minister of Labor, Game & Fisheries, plans fish distributing warehouses throughout the Province having refrigerating facilities and refrigerator trucks for deliveries.

BIDS ASKED

†Ark., Fort Smith—June 30 (extended date), by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office and elevator. Noted May 6, C. D.—May 14, E. N.-R.

†Calif., Los Angeles—June 30, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing federal jail (except elevator).

†Calif., Los Angeles—June 30, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing freight elevator in Federal Jail.

★**Calif., Sacramento**—June 25, by Bd. Educ., 21st and L Sts., rein.-con. Senior High School, main building unit, with gymnasium, cafeteria equipment, auditorium with stage equipment, etc., West Freeport Blvd. $750,000. Starks & Flanders, Bank of America Bldg., archts.

†Calif., San Francisco—June 22, by Treas. Dpt. at office Sup. Archt., Wash., D. C., metal shelving at U. S. Federal Building.

†Fla., Arcadia—June 30, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $66,000.

Ga., Athens—June 17, by Regents of University, State Capitol, Atlanta, scientific building for University of Georgia. $200,000. H. Driftman; Athens, archt.

†Ga., Cuthbert—June 30, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $60,000.

†Ga., Jesup—July 3, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $60,000.

†Ill., Park Ridge—July 3, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $98,000.

†La., Haynesville—June 19 (extended date) by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. Noted May 12, C. D.—May 14, E. N.-R.

†Md., Annapolis—Yards & Docks, Navy Dpt., Wash., D. C., taking bids constructing clock system at Bancroft Hall, Naval Academy. Spec. 8232. (Date not set.)

†Mich., Camp Custer—July 7, by Vet. Bu., Arlington Bldg., Wash., D. C., constructing and finishing complete at U. S. Veterans Administration Facility Infirmary Building 7.

†Mich., Ferndale—July 5, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $110,000.

†Miss., Biloxi—June 26, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing Guard House Building 18.

★**Mo., Jefferson City**—July 2, by State Penitentiary, Jefferson City and Bi-Partisan Advisory Bd., State Building Comn., E. M. Engan, executive secy., Jefferson City, rein.-con. stone cell block $800,121; second cell block building $645,026; administration building $310,000; connecting corridors $158,868; factory building $210,000; cold storage unit $65,305; dining hall $19,694; temporary dining hall and A and E Halls $32,369; garage $50,000; altering present administration building $15,000; utilities unit $100,600. Total $2,500,000. P.W.A. project. A. Gentry Voskamp & Neville, 4 West 13th St., Kansas City, archts.

†Mo., Marceline—June 30, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $64,000.

Mo., Marshall—June 26, by State Building Comn., C. A. Haskens, Jefferson City, general contract 3 story, basement, brick, concrete custodial buildings in connection with state hospital. $200,000. P.W.A. project. Sturdy & Farrar, Arcade Bldg., St. Louis, archts. C. A. Haskens, 426 Capitol Bldg., Jefferson City, engr. Noted Apr. 23, C. D.—Apr. 30, E. N.-R.

Mo., Nevada—June 26, by State Bldg. Comn., Capitol Bldg., Jefferson City, general contract 3 story, basement brick, concrete patients cafeteria in connection with State Hospital, $170,000. Keene & Simpson, Land Bank Bldg., Jefferson City, archts. C. A. Haskens, Capitol Bldg., Jefferson City, engr. Noted Mar. 2, C. D.—Mar. 5, E. N.-R.

†N. J., Hightstown—June 30, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $69,000.

N. Y., Brooklyn—June 15, by Dpt. Hospitals, S. S. Goldwater, comr., 125 Worth St., New York, altering plumbing, installing certain new plumbing fixtures, replacing water piping and all work incidental thereto for Male and Female Psychopathic Buildings (Building G), at Kings County Hospital, Clarkson Ave.

†N. Y., Rochester—June 29, by Treas. Dpt. at office Sup. Archt., Wash., D. C., remodeling (except elevator), U. S. Court House. $100,000.

N. Y., Warsaw—Bd. Supervs. Wyoming Co. bids about July 1, brick, steel hospital, plans found. C. W. Wibridge, 27 East Bridge St., Oswego, archt. Noted Apr. 16, C. D.—Apr. 23, E. N.-R.

†N. C., Clinton—June 26, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $68,000.

†N. C., Henderson—July 1, by Treas. Dpt. at office Sup. Archt., Wash., D. C., extending and remodeling U. S. Post Office. $132,000.

†N. C., Sanford—July 1, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $80,000. Noted June 26, 1935, C. D.—July 11, 1935, E. N.-R

†N. C., Warrenton—July 6, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $62,000. Noted Jan. 24, C. D.—Jan. 30, E. N.-R.

†N. C., Washington—July 1, by Treas. Dpt. at office Sup. Archt., Wash., D. C., extending and remodeling U. S. Post Office and Court House. $100,000. Noted June 26, 1935, C. D. —July 11, 1935, E. N.-R.

†N. D., Bismarck—June 30, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office and Court House. $275,000.

†N. D., Bismarck—June 30, by Treas. Dpt. at office Sup. Archt., Wash., D. C., elevator in extension and remodeling U. S. Post Office.

†O., Greenville—June 26, by Treas. Dpt. at office Sup. Archt., Wash., D. C., extending and remodeling U. S. Post Office. $55,000; adv. E. N.-R., June 11.

†S. C., Walterboro—June 30, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $64,000.

†Tex., Galveston—June 25, by Procurement Div. P. Wks. Branch, Wash., D. C., furnishing, installing interior lighting fixtures in U. S. Post Office, Custom House and Court House.

†Federal Government

Public Buildings (Continued)

★**Tex., Houston**—July 3, by City, c/o O. F. Holcombe, mayor, 1 story, basement, 2 balconies, 403x427 ft., brick, rein.-con., cut stone, exposition and convention hall. $1,000,000. A. C. Finn, Bankers Mortgage Bldg., archt. R. C. Cummins, Bankers Mortgage Bldg., consult. engr. Noted Sept. 11, C. D.—Sept. 19, E. N.-R.

Tex., Orange—June 18, by Oranze Co., c/o Judge E. Lee Davis, 3 story, basement, 145x164 ft., stone, marble trimmed, brick, rein.-con. court house. Bids May 26 rejected. C. H. Page, Gracy Bldg., Austin, archt. Noted May 1, C. D.—May 7, E. N.-R.

†**Tex., Quanah**—July 10, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $80,000.

†**Utah, Uintah**—June 26, by Dpt. Interior, constructing Ouray Hospital building.

†**Vt., Montpelier**—June 23, by Treas. Dpt. at office Sup. Archt., Wash., D. C., clearing site for U. S. Post Office.

LOW BIDDERS

★†**Ky., Louisville**—P. Wks. Administration. Div. Housing, Wash., D. C., May 28, constructing LaSalle Housing Project, Project H-2502, from T. L. James & Co., Ruston, La., $1,048,000. Noted May 27, C. D.—June 4, E. N.-R.

★†**Pa., Phila.** — P. Wks. Administration. Housing Div., Wash., D. C., constructing superstructures Hill Creek Housing Project H-3301C, from Starrett Bros. and Eken, 40 Wall St., New York, N. Y., $1,784,000. Noted Apr. 22, C. D.—Apr. 30, E. N.-R.

★†**Tenn., Nashville**—P. Wks. Administration, Div. Housing, Wash., D. C., July 3, constructing superstructures on Cheatham Place Housing, from Johnson, Drake & Piper, Baker Bldg., Minneapolis, Minn., $1,767,240. Noted June 1, C. D.—May 7, E. N.-R.

CONTRACTS AWARDED

†**Ala., Fayette** — Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office, to R. P. Farnsworth, 212 Nashville St., New Orleans, La., $42,650. Bids Apr. 21. Noted Apr. 24, C. D.—Mar. 26, E. N.-R.

★**Ala., Montgomery**—City, c/o W. A. Gunter, mayor, general contract 2 story, basement, 131x311 ft., complete job, city hall, not incl. air conditioning, to A. Blair, 1st Natl. Bank Bldg., Montgomery, $517,953. **P.W.A.** Bids May 27, awarded May 29. Noted June 1, C. D.—May 21, E.N.-R.

†**Ark., Wynne**—Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office, to R. P. Farnsworth & Co., 212 Nashville Ave., New Orleans, La., $47,000. Bids Apr. 21. Noted Apr. 24, C. D.—Mar. 26, E. N.-R.

Calif., Brea—Brea-Olinda Union High School Dist., Brea, reconstructing main classroom and auditorium buildings, rebuilding existing exterior 5 walls, etc., to W. T. Loesch, 119 East Union St., Pasadena, $115,250. **P.W.A.** Bids May 29, awarded May 29.

Calif., Los Angeles—Bd. Educ., Chamber of Commerce Bldg., new administration building, home economics building, demolition work, etc., at Virgil Junior High School, to N. W. Thiele Constr. Co., 1401 Santa Fe Ave., $203,500. Awarded May 29. Noted Jan. 24, C.D.—Jan. 30, E.N.-R.

†**Calif., Mare Island**—P. Wks. Officer, Mare Island Navy Yard, Mare Island, furnishing, installing refrigerating plant complete in Building M-37, Marine Barracks, to Parker Mfg. Co., 2625 Santa Fe Ave., Los Angeles, $1,721.

Calif., San Francisco—Public Utilities Comn., City Hall, rein.-con. structural walls, administration building, Mills Field Airport, for City and San Francisco Co., to Reed & Reed, Hearst Bldg., San Francisco, $141,799. Bids May 13. Noted Apr. 30, C. D.—May 7, E. N.-R.

Colo., Boulder—Secretary School Bd., 2 story and 3 story, irregular sized high school, to Mead Mount Const. Co., Denver Natl. Bank Bldg., Denver, $334,000. **W.P.A.** Noted Apr. 24, C. D.—Mar. 19, E. N.-R

Ga., La Grange—City, constructing hospital, to C. Mion, Bona Allen Bldg., Atlanta, $143,733. **P.W.A.** Noted May 8, C. D.—May 14, E. N.-R.

Ga., Valdosta—Bd. Regents, Capitol Bldg., Atlanta, constructing 2 story, basement, brick, stone, steel gymnasium, to Valdosta Constr. Co., Valdosta, $59,297. **P.W.A.** Noted Apr. 22, C. D.—Apr. 30, E. N.-R.

Ga., Statesboro—Bd. Regents, 230 State Capitol, Atlanta, 2 story, basement, brick, stone dormitory, to Artley Co., 504 East Bay St., Savannah, $77,427. Noted Oct. 26, C. D.—Nov. 2, E. N.-R.

†**Ill., Flora**—Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office, to Hiram Lloyd Building & Constr. Co., 1608 Syndicate Trust Bldg., St. Louis, Mo., $54,091. Bids May 13. Noted May 19, C. D.—Apr. 23, E. N.-R.

Ill., Kankakee—Dpt. P. Wks. & Buildings, Div. Architecture and Engineering, Springfield, electric wiring in Diagnostic Building, Kankakee State Hospital, to H. Newgard & Co., 549 West Washington St., Chicago, $18,793. **P.W.A.** Bids Apr. 30. Noted Apr. 24, C. D.

Ill., Quincy—Dpt. P. Wks. & Buildings, Div. Architecture & Engineering, Springfield, kitchen equipment for infirmary Illinois Soldiers and Sailors Home, to Duparquet Range Co., 1215-1231 Fullerton Ave., Chicago, $3,267***, electrical wiring, to Kelso-Burnett Electric Co., 223 West Jackson Blvd., Chicago, $11,397***, hospital equipment, to Scanlan-Morris Co., Madison, Wis., $1,687. Grand total $16,351. **P.W.A.** Bids Apr. 20. Noted Apr. 24, C. D.

Ill., Vandalia — Dpt. P. Wks. & Buildings, Div. Architecture & Engineering, Springfield, electrical wiring for Vandalia State House, to Y. E. Freidman, 328 West Main St., Belleville, Ill., $1,874; carpentry and metal furring, to C. F. Smith, Vandalia, $6,129. **P.W.A.** Bids Apr. 30.

†**Ind., Tell City**—Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office, to E. Embrey, New Albany, $45,330. Bids May 18. Noted May 21, C. D.—Apr. 30, E. N.-R.

†**Ia., Knoxville**—Vet. Bu., Arlington Bldg., Wash., D. C., constructing buildings at U. S. Veterans Hospital, to P. C. Bracker Constr. Co., 710 Natl. Bldg., Minneapolis, Minn., $216,808. Bids May 26. Noted June 1, C. D.—Apr. 30, E. N.-R.

†**Ia., Missouri Valley**—Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office, to Blauner Constr. Co., 189 West Madison Ave., Chicago, Ill., $50,674. Bids May 19. Noted May 21, C. D.—Apr. 30, E. N.-R.

Low Bidders

The McGraw-Hill *Construction Daily* reports low bidders. Business News Department, *Engineering News-Record*, 330 W. 42nd St., New York, N. Y.

Me., Augusta—F. W. Cunningham & Sons, general contractors, 181 State St., Portland, heating for dormitory at State Hospital, to Fels Co., 42 Union St., Portland, for State, Dr. H. C. Hanscone, dir***plumbing, to E. N. Cunningham, 363 Cumberland St., Portland***electrical work, to Cutler & Cutler, Inc., 186 Federal St., Portland***painting to Theodor Logan & Son, 161 Forest Ave., Portland***grid flat slab and caissons, to J. P. Cavanagh, 25 Medway St., Dorchester, Mass. Noted Apr. 13, C. D.—Apr. 16, E. N.-R., under "Contracts Awarded."

Me., Hallowell—F. W. Cunningham & Sons, general contractors, 181 State St., Portland, heating and plumbing, for dormitory and infirmary, school for girls, to T. W. Kerrigan Co., 151 Lisbon St., Lewiston for State, Dr. H. C. Hanscone, dir., Augusta***electrical work, to H. N. Blanchard Electric Co., 652 Congress St., Portland***granite, to John Finn & Co., 60 Riverside St., Lewiston***structural steel, to Lyons Iron Wks., 500 Willow St., Manchester, N. H.***ornamental steel, to E. Van Noorden Co., 100 Magazine St., Roxbury, Mass.***painting, to E. A. McLaughlin, Portland. Noted Dec. 6, C. D.—Dec. 12, E. N.-R., under "Contracts Awarded."

Me., Machias—W. V. Mitton, Inc., general contractors, 12 Winter St., Augusta, heating and plumbing for administration and school building, Washington State Normal School to Severance & Lane, Pittsfield, for State, Dr. B. E. Packard, state comr. Educ., State House, Augusta***electrical work, to Dole Electric Co., 61 Main St., Bangor***reinforcing and structural steel, to Lyons Iron Wks., Inc., 500 Willow St., Manchester, N. H.***roofing to Hahnel Bros. Co., 42 Main St., Lewiston***plaster and painting, by general contractor. Noted May 22, C. D.—May 28, E. N.-R., under "Contracts Awarded."

†**Md., Aberdeen**—Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office, to Blauner Constr. Co., 189 West Madison Ave., Chicago, Ill., $52,587. Bids May 12. Noted May 14, C. D.—Apr. 22, C. D.

†**Mass., Bedford**—Vet. Bu., Arlington Bldg., Wash., D. C., general contract 2 story, basement, 37x173 ft., two wings 2 story, basement 32x45 ft. and 2 wings 2 story, basement 37x173 ft. Buildings 6 and 7, incl. heating, plumbing and electrical work, for Neuro Psychiatric Buildings and Facilities, at U. S. Veterans Hospital, to T. O'Connor & Co., 238 Main St., Cambridge, $455,772. Bids Apr. 28. Noted May 1, C. D.

Mass., Spencer—J. W. Bishop, Co., general contractors, 109 Foster St., Worcester, roofing for brick, steel and stone high school, Main St., to Louis Cutler Roofing Co., Front St., Worcester for Town, Superintendent of Schools ***iron, to Stafford Iron Wks., Inc., 135 Stafford St., Worcester***marble, to Holmberg & Arvidson, Inc., 5 Tremont St., Worcester*** waterproofing, damproofing, to Chester Newman Co., Inc., 139 Main St., Cambridge***electrical work, to Alfred E. Senecal, P. O. Box 35, Westfield. Noted May 18, C. D.—May 21, E. N.-R., under "Contracts Awarded."

†**Minn., Minneapolis** — Treas. Dpt. at office Sup. Archt., Wash., D. C., repairing and remodeling elevator in old Post Office, to Haughton Elevator Co., 2117 K St., Wash., D. C., $3,612. Noted Apr. 6, C. D.—Apr. 9, E. N.-R.

†**Mo., Jefferson Barracks**—Con. Q. M., general contract repairing Barracks Building 29, to Brockmeyer-Bohle, Inc., Missouri Theatre Bldg., St. Louis, $4,290***plumbing, to I. E. Millstone Constr. Co., 4343 Clayton Ave., St. Louis, $2,800***heating, to Radley Heating Co., 3834 Olive St., St. Louis, $3,897. Grand total $10,987 Bids May 25. Noted June 4, C. D.

Mo., Sikeston — Sikeston School Dist. 54, Scott Co., R. E. Bailey, secy., general contract 2 story, 58x118 ft., brick school, to A. H. Gergardt & Son Constr. Co., Cape Girardeau, $39,500 base bid. Bids May 25. Noted May 15, C. D.

†**Nev., Boulder City** — Bureau Reclamation, Boulder City, furnishing, installing structural glass and accessories for wainscots, shower and dressing room stalls, etc., to Sanitary Constr. Co., Indianapolis, Ind., $12,100***marble and hollow tile partitions and furring for lobbies of elevator towers, to Wesco Co. Ltd., Santa Ana, Calif., $1,534***aluminum doors and appurtenant hardware, to A. J. Bayer & Co., 2360 East Slauson Ave., Los Angeles, Calif., $2,099. Grand total $15,733. Bids Apr. 10. Noted Mar. 24, C. D.—Mar. 26, E. N.-R.

†**N. J., Ocean City**—Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office, to Corrado-De Groodt Corp., 62 8th Ave., Newark, $94,900. Noted May 26, C. D.—June 4, E. N.-R.

N. Y., Auburn—Dpt. Correction, State Office Bldg., Albany, installing electric elevator in cold storage building at Auburn Prison, to Graves Elevator Co., Lyle and Sewey Aves., Rochester; refrigeration work, to H. J. Brandeles Corp., 435 Lafayette St., Utica, $40,972. Bids May 14. Noted May 20, C. D.—Apr. 30, E. N.-R.

N. Y., Avon—Swarthout & Rowley, general contractors, 548 Mount Hope Ave., Rochester, metal lathing and plastering for school, to Henderson-Johnson Co., 1407 East Erie Blvd., Syracuse; metal doors and door frames, to Overly Mfg. Co., Greenburg, Pa., for Union Free School Dist. 1, Avon. **P.W.A.** Noted Mar. 19, C. D.—Mar. 26, E. N.-R., under "Contracts Awarded."

N. Y., Brooklyn—Bd. Educ., 500 Park Ave., New York, heating for P. S. 49, to Daniel J. Rice, Inc., 31-65 29th St., Long Island City, $164,700. Bids Mar. 25. Noted Mar. 26, C. D.—Mar. 19, E. N.-R.

N. Y., Brooklyn—Bd. Educ., 500 Park Ave., New York, plumbing for P. S. 234, to Hygrade Plumbing Co., 325 West 25th St., New York, $29,780. Bids May 8. Noted May 11, C. D.—Apr. 30, E. N.-R.

N. Y., Churchville—Bd. Educ., Churchville, plumbing for school, to E. G. Snyder Co., Inc., 86 Scio St., Rochester***heating, to J. Davis, Root Bldg., Buffalo***electrical work, to Morrison Electric Co., 34 Hoover Rd., Rochester. Noted May 25, C. D.—May 7, E. N.-R.

N. Y., Dannemora—Dpt. Correction, State Office Bldg., Albany, sanitary work for administration building, Cell Block E, Dannemora Prison, to Barr & Creelman, 74 Exchange St., Rochester, $22,787. Bids Apr. 8.

N. Y., Elmhurst—Bd. Educ., 500 Park Ave., New York, plumbing for P. S. 127, to W. J. Endres Plumbing Co., 3165 29th St., $9,400. Electrical work, to H. Story, Inc., 37-58 85th St., Woodside, $23,980. Bids Mar. 30. Noted Apr. 3, C. D.—Mar. 5, E. N.-R.

N. Y., Gouverneur—Union Free School Dist. 1, general contract school, to E. C. Richards & Son, 2220 Douglas Crescent, Utica. Est. $223,985. **P.W.A.** Bids Apr. 9. Noted Apr. 15, C.D.—Apr. 2, E.N.-R.

†**N. Y., Hamilton**—Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office, to S. Plata, 2509 West Walnut St., Louisville, Ky., $49,950. Bids May 19. Noted May 21, C. D.—Apr. 30, E. N.-R.

N. Y., Holland Patent—Central Rural School Dist. 1, plumbing for school, to F. J. Hoffmeister, 1334 Lincoln Ave., Utica, $18,738***heating, to Hameline Co., Inc., 529 West Oriskany St., Utica, $19,490***electrical work, to Langdon & Hughes Electric Co., 230 Elizabeth St., Utica, $19,989***painting, to Swartsman & Muthig, 14 Calder Ave., $7,081. Grand total $65,298. General contractors let contract tile and marble, to Anthony Mion & Son, Inc., 428 Michigan Ave., Schenectady***stone, to Wollery Stone Co., Bloomington, Ind.***reinforcing steel, to Concrete Steel Co., 207 James St., Syracuse. **P.W.A.** Bids Apr. 21. Noted Apr. 28, C. D.

N. Y., Hudson—J. H. Eisele Co., Inc., general contractors, 18 East 41st St., New York, incinerator for school, Harry Howard Ave., for Bd. Educ., Hudson, to Pyroneel Co., Inc., 242 East 137th St., New York. **P.W.A.** Noted Dec. 11, C. D.—Dec. 19, E. N.-R., under "Contracts Awarded."

N. Y., Keesville—West Bros. Co., general contractors, Rouses Point, reinforcing steel for school, to Concrete Steel Co., 207 James St., Syracuse, for Central School Dist., Keesville. **P.W.A.** Bids Apr. 22. Noted May 12, C. D.—May 14, E. N.-R., under "Contracts Awarded."

N. Y., Lima—Iffland & Rogers, general contractors, 16 State St., Rochester, painting for

Constr. News page 421

†*Federal Government*

Public Buildings (Continued)

school, Rochester St., for Union Free School Dist. 1, Lima, to Bradley A. Cook, 3 Van St., Rochester; roofing, to Umland Bros., Inc., 868 Jefferson Ave., Rochester. **P.W.A.** Noted Apr. 7. C. D.—Apr. 9. E. N.-R., under "Contracts Awarded."

N. Y., Morrisville—Kraft & Detor, general contractors, 460 Kirk Ave., Syracuse, reinforcing steel for school for Central School Dist. 1, to Bethlehem Steel Co., Bethlehem, Pa.••• structural steel, to Syracuse Eng. Co., Everson Bldg., Syracuse. **P.W.A.** Noted May 13. C. D. —May 21. E. N.-R., under "Contracts Awarded."

N. Y., New Berlin—T. C. Brown Co., Inc., general contractors, 307 Union St., Schenectady, tile and marble for school, South Main St., for Central School Dist. 1, New Berlin, to Schenectady Tile Co., Inc., 785½ State St., Schenectady •••reinforcing steel, to Truscon Steel Co., Youngstown, O.•••steel sash, to H. G. Munger, 110 Wall St., Schenectady. **P.W.A.** Noted May 21. C. D.—May 28. E. N.-R.

N. Y., Pavilion—Bd. Educ. Central School Dist 1, heating for school, to L. H. Bulger, 1534 Kemore Ave., Buffalo•••plumbing, to H. M. Dechert, 81 Allen St., Buffalo•••electrical work, to Cooperative Electric Shop, Perry. **P.W.A.** Noted May 21. C. D.—May 28. E. N.-R., under "Contracts Awarded."

N. Y., Prattsburg—A. Friedrich & Sons Co., general contractors, 710 Lake Ave., Rochester, carpentry work for school for Bd. Educ., Central School Dist. 1, to A. Link Sons, 616 North Goodman St., Rochester; reinforcing steel, to F. L. Heuzhes & Co., 1029 Lyell Ave., Rochester. **P.W.A.** Noted May 13. C. D.—May 21. E. N.-R., under "Contracts Awarded."

N. Y., Rushford—R. E. Williams & Sons Co., Inc., general contractors, 303 Grote St., Buffalo, structural steel for school, for Central School Dist., to Bethlehem Steel Co., Bell and Abby Sts., Buffalo; stone, to Goodstone Mfg. Co., 470 Hollenbeck St., Rochester. **P.W.A.** Noted May 7. C. D.—May 14. E. N.-R., under "Contracts Awarded."

N. Y., South Dayton—Bd. Educ. School Dist. 9, general contract school, to C. H. Wing Co., 66 Allen St., Buffalo•••plumbing, to Jamestown Plumbing & Heating Co., 20 Cherry St., Jamestown•••heating, to L. H. Bulger, 1354 Kenmore Ave., Buffalo•••electrical work, to Booth Electric Co., Bradford, Pa. **P.W.A.** Noted May 29. C. D.—May 21. E. N.-R.

N. Y., Windham—Central School Dist. 1, general contract school, to James Forrestal Co., 60 Fishkill Ave., Beacon. Est. $275,000. **P.W.A.** Noted June 1, C.D.—May 14, E.N.-R.

N. Y., Wingdale—DeRiso Bros., Inc., general contractors, 410 Bergenline Ave., West New York, N. J., roofing for assembly hall, for Dpt. Mental Hygiene, State Office Bldg., to Globe Skylight & Roofing Co., Inc., 1666 Bergen Ave., Brooklyn; ornamental iron, to Ornamental Iron Wks., 929 Sweitzer St., Akron, O. Noted May 27. C.D.—June 4, E.N.-R., under "Contracts Awarded."

†O., Cincinnati — P. Wks. Administration, Housing Div., 21st and C Sts. N.W., Wash., D. C., foundations for Laurel Homes Housing Project H-1801, to Torson Constr. Co., Gest St. and Mill Creek, Cincinnati. $186,000. Bids May 14. Noted Apr. 22. C. D.—Apr. 30. E. N.-R.

†Okla., Pawhuska—Treas. Dpt., at office Sup. Archt., Wash., D. C., constructing U. S. Post Office, to H. W. Underhill, 235 North Waco St., Wichita, Kan., $52,475. Bids May 18. Noted May 21, C. D.—Apr. 30, E. N.-R.

†Pa., Lehightown—Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office, to Bonded Constr. Co., 110 East 42nd St., New York, $46,932. Bids Jan. 10. Noted Jan. 15, 1936. C. D.—Dec. 26, 1935. E. N.-R.

Pa., Pittsburgh—H. W. Cramblet, secy. Bd. Educ., 3 story, basement, 104x190 ft., brick, tile concrete Liberty Elementary and Junior High School to Navarro Corp., 6219 Broad St., $208,500•••heating and ventilating, to Campbell, Huggins & Donat, 119 Meyran Ave., $39,375•••plumbing, to W. N. Sauer Co., 809 equipment, to Troy Laundry Mchy. Corp., 470 heaters, to Buckeye Blower Co., 409 Arden Rd., $4,600•••temperature control, to Powers Regulator Co., 420 Oliver Bldg., $2,632. Grand total $269,957. Bids May 15. Noted May 14, C. D.—Mar. 12, E. N.-R.

Pa., Pittsburgh—Bd. Educ., Administration Bldg., electrical work for Liberty Elementary School, 3 story, basement, 104 x 190 ft., brick and steel, Ellsworth Ave., to McNeil Electric Co., 902 Kirkwood Ave., $24,138. Noted May 14, C. D.—Mar. 12, E. N.-R.

R. I., Burrillville—State, Emergency P. Wks. Comn., State House, Providence, electric wiring for laundry and shops at Wallum Lake Sanatorium, to Stanford Electric Constr. Co., 4 Westminster St., Providence, $1,400; laundry equipment, to Troy Laundry Mchy. Corp., 470 Stuart St., Boston, Mass., $17,734. Bids Apr. 24, awarded May 28. Noted Apr. 22, C. D.

†Tenn., Knoxville—Tennessee Valley Authority, Knoxville, fertilizer storage building extension, at Muscle Shoals, to Converse Bridge & Steel Co., 2408 Vance Ave., Chattanooga, $14,800•••guard fence on Pickwick Landing Lock, to Atlas Pipe Railing Co., 5-21 46th St., Long Island City, N. Y., $6,000•••core boring and testing in lower Tennessee Valley, to Cannon Bros., Compton, Calif., $40,000. **Grand total** $60,800. Bids May 18.

Constr. News page 422

†Vt., North Troy—H. P. Cummings Constr. Co., general contractors, 14 Prospect St., Ware, heating and plumbing, for U. S. Post Office, for Treas. Dpt. at office Sup. Archt., Wash., D. C., to E. Martin, Exchange Pl., Newport •••plastering, to J. S. Prunnier & Son, Inc., 9 Short St., Worcester, Mass.•••building finish, to Three Villages Building Assn., Derby Line •••tile, to Bianchi Bros., Inc., 31 Dustin St., Worcester, Mass.•••painting, to G. A. Authier & Son, 339 Main St., Palmer, Mass. Noted Jan. 3. C. D.—Jan. 9. E. N.-R.

Wash., Pullman—Hoard Eng. Corp., general contractor, Pullman, structural steel for constructing women's gymnasium for Washington State College, to Isaacson Iron Wks., 2917 East Marginal Way, Seattle•••masonry and plastering to Gust Lauch & Sons, 37 Dravus St., Seattle•••tile, to Robinson Tile & Marble Co., 600 Eighth Ave. N., Seattle•••terrazzo, to J. Bandini, 6718 35th St. S.W., Seattle••• reinforcing steel, to H. Powell, Seattle•••ornamental iron, to M. Foundry, 533 West Spokane St., Seattle•••ornamental aluminum, to M. W. Reuter, Portland, Ore.•••asphalt tile, to Durotile Co., Henry Bldg., Seattle•••painting, to West Coast Painters, Kulien Bldg., Seattle••• steel sash, Fentron Steel Wks., 1420 West Galer St., Seattle. Noted May 1. C. D.—May 7. E. N.-R.

†W. Va., Welch—Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office, to A. Farnell Blair, Petersburg, Va., $92,570. Noted Apr. 14. C. D.—Apr. 16. E. N.-R.

Ont., Ottawa—Secretary Dpt. P. Wks., Ottawa, constructing machinery building at Central Experimental Farm, to Alex J. Garvock, Regent Theatre Bldg., Sparks St. Est. $175,000. Noted May 28. C. D.—June 6. E. N.-R.

Ont., Ottawa—French Govt., Hon. R. Brugere, French Minister, Laurier Ave. E., constructing brick, stone legation building, Sussex St., to Colbet Bros., Montreal, Que., about $450,000. Noted May 19. C. D.—May 21. E. N.-R.

COMMERCIAL BUILDINGS

PROPOSED WORK

Calif., Arrowhead Springs — Arrowhead Springs Hotel, H. S. Ward, mgr., 637 South Grand Ave., Los Angeles, plans by E. T. Heitschmidt, 808 Subway Terminal Bldg., Los Angeles, hotel, casino, bathhouse, etc. Construction will be started this summer on bathhouse $60,000, bungalows $25,000 or $30,000, casino $75,000. Work will start next spring on hotel $250,000. Total est. $410,000.

Calif., Beverly Hills—Owner, c/o H. E. Werner, archt., 444 North Camden Dr., making plans 3 story, basement, rein.-con. Class A medical building, Dayton Way and Cannon Dr.

★ **Calif., Hollywood**—Technicolor Motion Picture Corp., Dr. H. Q. Kalmus, pres., 823 Seward St., plans steel, concrete Class A building, Cole Ave., and expect to produce 150,000,000 ft. of film annually with new plant. $1,500,000. Architect not appointed.

Calif., Santa Cruz—Coast Counties Gas & Electric Co., Santa Cruz, plans 3 story, rein.-con. office. $150,000. Architect not appointed.

Calif., West Los Angeles—Twentieth Century Fox Film Corp., 10,260 Orton Ave., soon lets contract 3 story, 37x221? ft., rein.-con., steel film cutting and storage building, 10,260 Orton Ave. $140,000. Completed working drawings for 1 story, 44x64 ft. and 46x118 ft., 2 ventilating apparatus rooms. To exceed $37,500. J. A. Barlow, 10,260 Orton Ave., engr. Noted May 25. C. D.—May 28, E. N.-R.

Conn., Hartford—Veterans Foreign Wars, J. Kenny, chn. Building Com., 165 Capitol Ave., plans 1 story, basement, brick chapel, Soldiers Field. $140,900. Architect not appointed.

Mass., Malden—L. Friedman, 1540 Broadway, New York, bids after July 1, theatre, $140,000. T. W. Lamb, 701 7th Ave., New York, archts. Noted May 26. C. D.

Minn., Moorhead—Concordia College, A. G. Dosland, pres. Building Comn., plans 2 or 3 story women's dormitory, $150,000.

Miss., Tupelo—North Mississippi Community Hospital Corp., c/o B. W. Reed, pres., at office of Secretary, 117 Broadway, North Tupelo, soon lets contract 2 story, basement, brick, stone hospital, 2 story, basement, brick nurses home building, on Hy 45 in suburban Tupelo, $300,000. H. C. Pelton & James G. Rogers, 415 Lexington Ave., New York, archts. Noted May 18, C. D.—May 21, E. N.-R.

Mo., University City—H. P. Hess, archt., 1001 Ambassador Bldg., St. Louis, soon lets contract 4 story, basement, 70x130 ft. church, Westgate and Clemens Aves., for All Saints Church, G. M. Ryan, pastor, 5403 Clemens Ave. Noted May 21, C. D.—May 28, E. N.-R.

N. J., Chatham—Richard Bradley, 445 4th Ave., Newark, plans by G. W. Backoff, 48 Commerce St., Newark, housing development consisting of twenty-five to thirty 2½ story, basement, homes from $7,500 to $11,000 each. Est. $225,000 plus.

N. J., Morristown—McEvoy Constr. Co., 87 Academy St., Newark, plans by G. W. Backoff, 48 Commerce St., Newark, 2½ story, basement housing development (23 homes), Madison and Franklin Aves. Est. $250,000 plus.

N. Y., Binghamton—Vestel Hills Corp., J. R. Thorne, in charge, Binghamton, plans constructing 12 residences, on MacArthur tract, near Vestal Ave. Private plans.

N. Y., Brooklyn—One Hundred Seventy-Five Remsen Street Corp., 42 Bway., New York, plans by S. Rosenblum, c/o owner, heating, plumbing in two 5 story apts., 332 Pearl St. $37,000 with fixtures.

N. Y., Brooklyn—Albemarle Apartments, Inc., 26 Court St., plans by J. W. Sherman, c/o owner, 6 story, brick apartment, 191 E. 17th St. Est. about $140,000.

N. Y., Buffalo—Richmond Bros. Co., [illegible] plans constructing 3 story, fireproof store, Main and North Division Sts. To exceed $1[illegible]. **Maturity in summer.** Private plans.

N. Y., East Williston — Realty Associates, Hillside Heights, plans by B. Driesler, Jr., c/o owner, constructing (2nd unit), group dwellings, Hillside Heights. $150,000 or more.

N. Y., Flushing—Rocky Hill Homes, Inc., 17 West 46th St., New York, plans by A. E. Allen, Garden City, group 2 story, frame dwellings, 196th St. near 48th Ave. $140,000.

N. Y., Hollis—Kalbar Homes, Inc., 150 East 31st St., Brooklyn, plans by M. Rothstein, 391 Fulton St., Brooklyn, constructing group 2 story, brick dwellings, Cross Island Blvd. and 89th Ave. $140,000.

N. Y., Jackson Heights—N. Brait, 126 Montague St., Brooklyn, plans by D. J. Levinson, 161-02 84th Dr., Jamaica, constructing group 40 or more 2 story, 20x36 ft., brick dwellings. Est. about $140,000.

N. Y., Jackson Heights—Danby Homes, 4410 25th Ave., Long Island City, plans by Wiest & Bailey, 32-02 30th Ave., Long Island City, 2 story, brick dwellings, 95th St. and 23rd Ave.

N. Y., Jamaica—M. and M. Realty Corp., 163-18 Jamaica Ave., plans by D. J. Levinson, 161-02 84th Dr., constructing groups, 1 story, frame dwellings, 174th St. and Rockaway Blvd. $140,000.

N. Y., New York—H. Goldsmith, c/o H. I. Feldman, archt., 15 West 44th St., plans constructing 6 story apartment, Jessup Ave. near Featherbed Lane. Est. about $140,000.

N. Y., New York—Hotel Times Square, 43rd St. and 8th Ave., plans by Aaronson & Heidrich, 32 Bleecker St., air conditioning, electrical work, plumbing, heating alterations to hotel, 43rd St. and 8th Ave. $105,000.

N. Y., New York—St. Joseph's Hospital, 127 South Bway., plans installing refrigeration plant in hospital building. $25,000. Owner will purchase refrigeration equipment.

N. Y., New York—One Hundred Fifty-Three East 96th Street Corp., I. Meehan, pres., c/o A. H. Lench, archt., 512 5th Ave., altering heating, plumbing in apartment, 153 East 96th St. Est. about $100,000.

N. Y., New York—Park Side Estates, c/o J. Janos, pres., Bronxdale and Cruger Ave., plans 6 story apartments, Bronx Park East near Pelham Parkway. To exceed $300,000. Site acquired. Architect not appointed.

N. Y., New York—Sands Place Realty Corp., 1315 Hobart Ave., plans by J. Vinci, c/o owner, group 2 story, 21x50 ft. dwellings, Schuyler Pl. near Arnow Pl. $140,000.

★ **N. Y., New York**—Sisters of Poor of St. Francis, 609 East 5th St., plans by F. J. and S. W. Murphy, 280 West 246th St. and c/o owner, 7 story, hospital, Independence Ave. near 231st St. $1,000,000.

N. Y., New York—Two Thousand Two Hundred Eleven Third Avenue Corp., c/o Sachs Quality Furniture, Inc., lessee, 2223 3rd Ave., plans altering, heating, plumbing, elevator in 4 story, store and storage, 2211 3rd Ave. $60,000.

N. Y., New York—B. Winter, 51 East 42nd St., plans constructing apartment, Bway. and 22nd St. To exceed $400,000. **Maturity indefinite.** Architect not appointed.

N. Y., Pawling—Pawling School for Boys, North Rd., soon lets general contract 3 story, basement, 46x470 ft. science building, North Rd., $140,000. H. C. Pelton, 415 Lexington Ave., New York, archt. Noted Mar. 30, C. D.—Apr. 2. E. N.-R.

N. Y., St. Albans—M. Jeruss, 148-25 84th St., Woodhaven, plans by J. Fein, 1797 Pitkin Ave., Brooklyn, constructing group 1 story, brick dwellings, 114th Rd. near Springfield Blvd. $140,000.

N. Y., Utica—Commercial Travelers Mutual Accident Assn., 70 Genesee St., soon takes bids constructing 5 story, basement, 60x100 ft. office building, Genesee St. $150,000. Gouge & Ames, 80 Genesee St., archts. Noted Mar. 19, C. D. —Mar. 26. E. N.-R.

N. Y., West Hempstead — Hempstead Park Acres, Inc., c/o M. Stitch, Hempstead Ave., South Elm and South Walnut Sts., plans by M. Johnke, Hempstead, constructing dwellings, tract development, Hempstead Ave., South Elm and South Walnut Sts. $140,000. Site acquired.

★ **N. Y., Woodside**—Corporation, c/o G. Horner, 200 West 42nd St., New York, plans constructing group dwellings, on 10 acre site, 39th Ave., 52-54th Sts. To exceed $1,000,000.

N. C., Charlotte—Johnson C. Smith University, Dr. H. L. McCrorey, pres., Charlotte, plans girls' dormitory. To exceed $125,000. Campaign to raise funds for above planned.

Pa., Pittsburgh — Henry W. Oliver Estate, Oliver Bldg., sketches by J. P. Piper & H. M. Kropff, Oliver Bldg., installing new elevators and elevator shafts in store building, Oliver Ave. and Liberty St. Meyer-Jonasson Co. Department Store, Oliver Ave. and Liberty St., lessee.

Pa., Swarthmore—Swathmore College plans by Karcher & Smith, 1520 Locust St., Phila., 3 story, basement, steel, stone, biology building.

†Federal Government

Commercial Buildings (Continued)

concrete found., at Swarthmore College. $200,000. Cram & Ferguson, 248 Boylston St., Boston, Mass., asso. archts.

Pa., Wilkes-Barre — Polish Union of North America, 711 Miners National Trust Bldg., plans by J. E. Fronczak, 1176 Walden Ave., Cheektowaga, N. Y., and soon takes bids 3 story, 70x90 ft., brick, steel, concrete office building.

Wash., Seattle — Swedish Hospital, Summit and Columbia Sts., plans completing heating plant for nurses' home, $50,000, an additional $50,000 will be spent for equipping nurses' home and power plant. Minor and Marion Sts. Total est. $150,000.

★ **Ont., Ottawa**—Bank of Canada plans by Marani, Lanson & Morris, Toronto, and S. G. Davenport, Montreal, Que., new central bank building, Wellington St. About $600,000. Noted Apr. 22, C. D.—Apr. 30, E. N.-R.

Que., St. Elzear—Abbe J. Edward Plourde plans new Roman Catholic Church and school. $150,000. **Maturity indefinite.**

Que., St. Justine—Abbe J. A. Kirouac making plans new concrete, stone, steel Roman Catholic Church. $150,000. Private plans.

BIDS ASKED

Calif., Burlingame—W. P. Peugh, archt., 333 Montgomery St., San Francisco, taking bids rein.-con. bank and offices, for San Francisco Bank, 526 California St., San Francisco. $150,000.

Mass., Boston—June 15, by Blackall, Clapp, Whittemore & Clark, archts., 31 West St., Boston, 6 story, basement, granite, marble, cast stone office, concrete and granite base, Batterymarch St., for Boston Automatic Fire Alarm Co., 141 Milk St. Est. $350,000.

N. Y., Buffalo—Y.M.C.A., 45 West Mohawk St., taking bids general contract, plumbing, heating and electrical work for altering Y.M.C.A. building, North & Shelgren, Crosby Bldg., engrs. Noted May 27, C. D.

N. Y., Flushing—See "Contracts Awarded."

N. Y., New York—See "Contracts Awarded."

N. Y., Rego Park—See "Contracts Awarded."

N. Y., Troy—Emma Willard School, Pawling Ave., taking bids (from selected list bidders) stone, steel, science building, plain found., Pawling Ave. $175,000. J. R. Hamtson, Pittsfield, Mass., archt.

Wis., Milwaukee—June 22, by Allen, Collins & Willis, archts., 75 Newberry St., Boston, Mass., constructing 3 story, basement, brick library building, plain found., East Hartford Ave., for Milwaukee Daurer College, 2513 Hartford Ave. $250,000.

CONTRACTS AWARDED

★ **Idaho, Ketchum**—Union Pacific R.R. Co., Omaha, Neb., constructing 170 room hotel and resort, to J. V. Neil Constr. Co., Los Angeles, Calif., $500,000. H. C. Mann, Omaha, Neb., engr.

Mass., Waltham—United Equities Corp., 131 State St., Boston, 75 residences, Warren St. and Wilmot Rd., concrete founds., separate contracts now being awarded. Work started. To exceed $350,000. R. M. Peirce, 307 Merrimac St. Newburyport, archt.

Mo., Ferguson—Temple Theatre Co., c/o T. E. and H. E. Hulett, 25 South Clark Ave., 2 story, basement, 46x146 ft., brick, steel theatre, store and office, South Florissant Blvd., to F. Voirol, c/o Cinderella Theatre Bldg., 2735 Cherokee St., St. Louis.

Mo., St. Louis—Sisters of Mercy, c/o Mother Ignatius, superior, Laclede Station Rd. and South Spring Ave., Webster Groves, general contract 4 story, basement, rein.-con., brick, stone home for business women on 398x446 ft. site, Newstead Ave. between Maryland and Pershing Rds., to Mississippi Valley Constr. Co., Wainwright Bldg. Est. $235,000. Bids May 4. Noted Apr. 27, C. D.—Apr. 30, E. N.-R.

N. H., Concord—J. W. Bishop Co., general contractors, 109 Foster St., Worcester, excavation for 3 story, basement, 60x159 ft., and 52x72 ft. and 30x48 ft. wings school, to Dooley Bros., 39 George St., Roxbury, Mass., for St. Paul's School, Concord. Noted May 22, C.D.—May 28, E.N.-R., under "Contracts Awarded."

N. Y., Brooklyn—Hawthorne Street Corp., 550 Flatbush Ave., constructing 6 story, apartment, 45 Hawthorne St., separate contracts. $165,000. Owner taking bids. B. W. Dorfman, 56 Court St., archt. Noted May 4, C. D.—May 7, E. N.-R.

N. Y., Brooklyn—Roman Catholic Church of St. Bernardette, F. P. Barilla, pastor, constructing church, separate contracts awarded. Est. about $140,000. H. V. Murphy, 208 Livingston St., archt. Noted Mar 12, C. D.—May 14, E. N.-R.

N. Y., Brooklyn—Org Realty Corp., c/o B. J. Govern, 1501 Kings Highway, constructing 6 story, apartments, 547 Prospect Park South, separate contracts now being awarded. $150,000. Private plans. Noted Apr. 27, C. D.—Apr. 30, E. N.-R.

N. Y., Brooklyn—Sister Adorers of the Precious Blood, 5302 Fort Hamilton Parkway, altering monastery and church, Fort Hamilton Parkway, to Patrick Constr. Co., 464 5th Ave. Est. $140,000. Noted May 12, C. D.—Apr. 16, E. N.-R.

N. Y., Buffalo—J. W. Cowper Co., general contractors, 775 Main St., Buffalo, structural steel for department stores, 465 Main St., for William Hengerer Co., 465 Main St., Buffalo, and Associated Dry Goods Corp., 4 West 35th St., New York, to Ernst Iron Wks., 75 Lathrop St. ***4 elevators, to Westinghouse Electric Elevator Co., Ellicott Sq.***electrical work, to Volker Bros., 891 Washington St., Buffalo*** sprinkler system, to Viking Automatic Sprinklers, Inc., 775 Main St., Buffalo. Noted May 22, C. D.—May 28, E. N.-R., under "Contracts Awarded."

N. Y., Flushing—Kissena Park Homes, 163-18 Jamaica Ave., Jamaica, constructing group dwellings, 59th Ave. and 152nd St., by day labor and separate contracts. H. Silman, c/o owner, archt. Noted May 4, C. D.—May 7, E. N.-R.

N. Y., New York—Bowman-Biltmore Hotels, 109 East 42nd St., altering heating, plumbing in hotel, 400 Lexington Ave., separate contracts. $38,000 with fixtures. J. P Gallagher, c/o owner, archt. Noted May 7, C. D.—May 14, E. N.-R.

N. Y., New York—Alpark Realty Corp., 4375 Bway., S. Alexander, pres., 6 story, apartments, Decatur Ave. near 202nd St., separate contracts now being awarded. $150,000. I. L. Crausman, 332 East 149th St., archt.

N. Y., New York—Franklin Savings Bank, 656 8th Ave., altering heating, plumbing in apartments, 103 West 69th St., separate contracts. $37,000 with fixtures. F. S. Keeler, 304 West 13th St., archt. Noted May 1, C. D.

N. Y., New York—Two Hundred Northern Avenue Corp., 521 5th Ave., constructing 6 story apartment, 822 West 187th St., separate contracts now being awarded. $250,000. Boak & Paris, 101 Park Ave., archts. Noted Apr. 27, C. D.—Apr. 30, E. N.-R.

N. Y., New York—Greenwood Cemetery, 52 Vanderbilt Ave., general contract altering, heating, plumbing in 6 story, apartment and 218 East Bway., to Shroder & Koppel Corp., 295 Madison Ave. Est. $40,000. A. Weiser, 240 Madison Ave., archt. Noted May 13, C. D.—May 21, E. N.-R.

N. Y., New York—Marc Eidlitz & Son, Inc., general contractors, 110 East 42nd St., New York, about 1,500 tons structural steel for 12 story, 100x200 ft. nurses' home, for St. Lukes Hospital, 417-21 114th St., to Bethlehem Steel Co., Bethlehem, Pa. Noted Mar. 9, C. D.—Mar. 12, E. N.-R., under "Contracts Awarded."

N. Y., New York—Sam Ray Realty Co., 161 East Gun Hill Rd., 6 story, apartment, DeKalb Ave. and 212th St., separate contracts. $150,000. I. J. Crausman, 332 East 149th St., archt. Noted May 4, C. D.—May 7, E. N.-R.

N. Y., Rego Park—Happy Homes, Inc., 37-53-90th St., constructing group brick dwellings, separate contracts and day labor. $140,000. Private plans. Owner is purchasing materials. Noted May 4, C.-D.—May 7, E. N.-R.

N. Y., Rochester—Jewish Home for Aged, 1162 St. Paul St., general contract infirmary, 1162 St. Paul St., to A. Goldstein & Sons Co., 215 Cumberland Ave.; electrical work, to T. H. Green Electric Co., 31 North Water St. General contractor sublet contract for masonry work (incl. materials), to A. Freiderich & Sons, 710 Lake Ave. Noted May 8, C. D.—May 14, E. N.-R.

N. Y., Schenectady—Eastern New York Orthopedic Hospital School, Inc., 1090 Baker Ave., plumbing for hospital, to G. E. Van Vorst Co., Inc., 47 Mohawk Ave., Scotia; electrical work, to J. F. Burns, 206 Clinton St., Schenectady. Noted June 11, C. D.—June 4, E. N.-R., under "Contracts Awarded."

N. Y., Syracuse—Dawson Constr. Co., general contractors, Union Bldg., structural steel for Parochial school, Colvin St., for St. Anthony of Padua Roman Catholic Church, 1605 Midland Ave., to Syracuse Eng. Co., Everson Bldg.*** roofing, to Sheridan Roofing Co., 819 West Fayette St.***cast stone, to Onondaga Litholite Co., 102 North Beech St.***ornamental iron, to Heckerman Iron Wks., 1100 East Water St. ***marble and tile, to Syracuse Mantel Tile & Marble Co., 333 East Genesee St. Noted May 21, C. D.—May 28, E. N.-R., under "Contracts Awarded."

★ **N. C., Durham**—Homeland Investment Co., Durham, 17 story banking and mercantile building, Main St., to George W. Kane, Roxboro, approximately $900,000. George Watts Carr, Durham, archt. Noted June 5, C. D.

O., Cleveland—North Moreland Co., c/o C. Bernstein, Society for Savings Bldg., constructing 4 story, basement, 36 suite, brick, steel apartment on North Moreland Blvd., to Dolin Constr. Co., Society for Savings Bldg. Est. $250,000. J. H. Graham, Hanna Bldg., archt. Noted Mar. 17, C. D.—Mar. 19, E. N.-R.

Pa., Erie—St. Mary's Catholic Congregation, M. Schamberger, pastor, 315 9th St., plumbing and heating for 2 story, basement, 85x170 ft. recreational center, to Lakes Eng. Co., 903 Parade St., $4,021 and $18,837 respectively; electrical work, to N. West Electric Constr. Co., 323 State St., Erie, $4,835. Grand total $17,693. Noted May 22, C. D.

Pa., Latrobe—G. C. Murphy Co., E. M. Mack, in charge of construction, 535 5th Ave., McKeesport, general contract 2 story, basement, irregular sized, brick, steel 5 and 10 cent store building, 810-12 Ligonier St., to J. E. Snyder Co., 122 East Pittsburgh St., Greensburg. Noted May 1, C. D.—May 7, E. N.-R.

Pa., Sharon—Protected Home Circle Co., 23 Chestnut St., S. H. Hadley, pres., general contract rebuilding 4 story, basement, brick, steel, stone office building, passenger and freight elevators, State St., to Interior Finish & Millwork Co., 9517 Meech Ave., Cleveland, O., $225,000 cost plus basis. Noted May 26, C. D.—June 4, E. N.-R

†*Federal Government*

INDUSTRIAL BUILDINGS

PROPOSED WORK

Ariz., Prescott — MILL — Columbia Metal Mines Co. plans 500 ton capacity gold reduction mill, incl. dragline shovel, grizzly, gyratory crusher, 8x8 ball mill, 250 hp. motor and miscellaneous equipment.

Calif., Oakland—PLANT—Chevrolet Motor Co., East 14th St. and 105th Ave., plans assembly plant reconstruction, East 14th St. and 105th Ave. To exceed $40,000.

Calif., San Francisco—PLANT—J. F. Beuttler, 110 Sutter St., rejected bids, 1 story, rein.-con. dye plant, Alabama and Mariposa Sts., for Color Craft Corp., 550 Alabama St. Est. $30,000 exclusive of equipment. Noted Apr. 16, C. D.—Apr. 23, E. N.-R.

Conn., East Hartford (br. Hartford)—PLANT—Clds & Whipple, Inc., 166 State St., Hartford, soon lets contract 130x145 ft., fertilizer plant addition. Est. $40,000. Mylchreest & Reynolds, 238 Palm St., Hartford, archt.

Fla., Port St. Joe—PAPER MILL—St. Joe Paper Co., recently organized by Almours Securities, Inc., Barnett Bldg., Jacksonville, E. Ball, pres., and Mead Corp., Chillicothe, C., G. H. Mead, chn., plans construction paper mill for manufacture of kraft linen board used in shipping containers. G. F. Hardy, 305 Broadway, New York, engr. Est. $7,500,000.

La., New Orleans—PLANT—Hart Enterprise Electrical Co., 832 Baronne St., plans repairing fire damaged plant, and equipment, 832 Baronne St. Fire Loss $100,000. Architect not appointed.

Me., Lewiston — PRINTING OFFICE — Le Messager, 225 Lisbon St., plans by S. S. Merrill, 9 Vine St., Auburn, 2 story, basement, 70x100 ft., brick, steel printing office, concrete found., Canal and Pine Sts. $38,000 or more.

Md., Baltimore—DAIRY—Will's Dairy, 2016 Fleet St., plans by P. T. Bond, 618 East 34th St., 2 story, 80x122 ft., brick, concrete dairy, plain found.

Mass., Fall River—SUPER-SERVICE STATION—Pacific Oil Co., Central St., plans by S. T. Dubitsky, 38 Third St., 1 story, basement, 25x60 ft., brick, cast stone super-service station, concrete found., Pleasant St. and Plymouth Ave.

Minn., Albany—PLANT—Ward Dry Milk Co., subsidiary National Dairy Co. and Kraft Phenix Cheese Corp., 400 North Rush St., Chicago, Ill., plans 2 story, 60x125 ft., brick, concrete dry buttermilk plant, 400 hp. boilers. $165,000.

Minn., St. Paul—BULK OIL PLANT, etc.—Continental Oil Co., 1018 2nd St. S., Minneapolis, making plans brick, rein.-con. bulk oil plant, warehouse and office, University Ave. near Cleveland Ave. $150,000. Private plans.

N. Y., Brooklyn—DISTRIBUTION and STORAGE—United Parcel Service Corp., 331 East 38th St., New York plans distribution and storage building, Crown St. and Bedford Ave. $150,000.

N. Y., New York—STORAGE GARAGE, etc.—Fordham Towers, Inc., 810 East 170th St., L. Cella, pres., plans by E. W. Franklin, 112 East 157th St., storage garage and auto showrooms, Field Pl., Ryder Ave. and Grand Concourse. $40,000.

N. Y., New York—STORAGE—Baltimore & Ohio R.R. Co., H. A. Lane, ch. engr., Baltimore, Md., plans 1 story storage, 180 3rd Ave. $38,000. Private plans.

N. Y., Buffalo—BREWERY—Iroquois Beverage Corp., 230 Pratt St., soon takes bids constructing steel, cork insulation and asphalt floors, masonry contract separate, for brewery addition at 230 Pratt St. $80,000 or more. J. Schultz & Son, 1370 Main St., archt.

N. Y., Rochester—ICE CREAM MANUFACTURING—Walgreen Co., 744 East Bowen Ave., Chicago, Ill., and 90th Ave. E., Rochester, plans constructing ice cream manufacturing plant, installing air conditioning, 80 seat fountain, adding 2 stores to present plant, 123 Main St. E. $100,000.

N. Y., Utica—WAREHOUSE, etc.—Richfield Oil Co., 19 West 50th St., New York, and Utica, plans warehouse, office and garage, 5 large storage tanks. To exceed $40,000.

N. Y., Woodside—PLANT—Gehnrich & Gehnrich, 32-37 50th St., plans by Wuest & Bailey, 32-02 30th Ave., Long Island City, 1 story, 80x100 ft., brick plant, 57th St. near 32nd Ave.

N. J., Hoboken—PLANT—Universal Folding Box Co., 94 34th St., Brooklyn, N. Y., plans reconditioning plant on 12th and Monroe Sts. Property acquired. $38,000 or more.

Okla., Holdenville—GASOLINE REFINERY—Mid Continent Petroleum Corp., 1128 West Main St., Oklahoma City, plans gasoline refinery, $100,000.

Okla., Oklahoma City—WAREHOUSE—International Harvester Co., final plans 2 story, basement, 100x150 ft. warehouse, 9 West 5th St. $175,000. Private plans. Noted Aug. 15, E. N.-R.

Pa., Beaver Falls—PLANT—Armstrong Cork Co., R. Lescallette, genl. supt., 27th St. at 8th Ave., plans cork brick plant, 27th St. at 8th Ave. $150,000. Private plans.

Pa., Meadville — DISTILLERY — Meadville Pennsylvania Distillery Co., Inc., T. Kratz, supt. in charge, completing plans 8 story, 80x118 ft., brick, steel warehouse, 3 story, 80x110 ft. bottling house, new 30x60 ft. grain elevator, 60 ft. high, complete rehabilitation of

Constr. News page 424

Industrial Buildings (Continued)

present buildings off State Hy. 98. $300,000. F. F. Bollinger Co., Ambridge, design engr.

Pa., Mt. Bethel—STORAGE, etc.—Portland Sand & Gravel Co., Mt. Bethel, plans rebuilding storage bins and crushing plant, incl. installation new machinery and equipment to replace equipment, recently destroyed by fire. Also plans reconditioning another unit at plant. To exceed $37,000. Private plans.

Pa., Phila.—FILM EXCHANGE—Paramount Pictures, Inc., Paramount Bldg., New York, plans by J. E. Casale, 14 East 47th St., New York, and soon takes bid 2 story, film exchange, 12th and Summer Sts. $100,000.

Pa., Pittsburgh—OIL REFINERY—Waverly Oil Wks. Co., 54th St. and Ave. R.R., S. M. Vockel, pres., soon takes bids general contract oil refinery, incl. power plant and dewaxing plant, 54th St. and Ave. R.R. Rust Eng. Co., Clark Bldg., engrs. Noted Apr. 23, C. D.—Apr. 30, E. N.-R.

★ **Wash., Everett**—PLANT—Soundview Pulp Co., preliminary surveys for steel, brick, concrete additions to present plant, contingent upon obtaining enough water from city. $2,000,000. H. S. Ferguson, 200 5th Ave., New York, engr. Noted June 2, C. D.—June 4, E. N.-R.

Wis., Merrill—FACTORY—Merrill Industrial Foundation C. R. Livingston, pres., plans being completed by G. A. Krasin, Marshfield, 3 story, 52x272 ft. brick, steel factory, plain found.

Alta., Edmonton—PLANT—Grant Eng. Co., Montreal, Que., plans constructing plant by which Alberta coal will be processed under the "Suncole" system, capacity 500 tons a day. $150,000.

BIDS ASKED

Calif., El Cerrito—FACTORY—J. Narbett, archt., 462 31st St., Richmond, taking bids 1 story, 75x150 ft., brick, hollow tile, corrugated iron roofing factory for Technical Porcelain Chinaware Co., c/o architects.

Calif., San Francisco—PLANT—H. Moffat Co., 3rd St. and Arthur Ave., taking bids 1 story, basement, 75x145 ft., rein.-con. meat distribution plant, Langton and Brannan Sts. J. Smith, 251 Kearny St., engr.

Calif., San Francisco—PLANT—J. Rosenwald, engr., 525 Market St., taking bids rein.-con. publishing plant, 23,000 sq.ft. floor space, Van Ness Ave. and 13th St. S., for Jas. H. Barry Co., 1122 Mission St. Noted Apr. 3, C. D.—Apr. 9, E. N.-R.

Conn., Hartford—LAUNDRY—New England Laundry Co., 455 Homestead Ave., bids about July, 4 story, 150x150 ft., brick, steel laundry completion, Homestead Ave., $50,000. Mylchreest & Reynolds, 238 Palm St., archts. Noted Nov. 1, C. D.—Nov. 7, E. N.-R.

Conn., Old Greenwich—FACTORY—Electrolux Co., C. A. Rudin, constr. engr., 500 5th Ave., New York, taking bids 3 story, basement, 100 x 150 ft., factory addition. Private plans.

D. C., Wash.—WAREHOUSE—June 19, by Hecht Co., F and 7th Sts., constructing storage warehouse. To exceed $100,000. Abbott Merkt & Co., 22 West 40th St., New York, engrs. and archts. Noted Mar. 24, C.D.—Feb. 20, E.N.-R.

Me., Portland—WAREHOUSE, etc.—G. Duffey, c/o O. I. Emerson, archt., 396 Sawyer St., South Portland, taking bids 1 story, basement, 50x100 ft., brick, warehouse and store concrete found., Woodsford Corner.

Mass., Quincy—WAREHOUSE, etc.—H. M. Faxon, 1245 Hancock St., taking bids 1 story, basement, 95x160 ft., brick, steel warehouse and store, concrete found., Hancock St. Shepard & Stearns, 65 Franklin St., Boston, archts.

Neb., Omaha — WAREHOUSE — Socony-Vacuum Oil Co., Federal Reserve Bldg., Kansas City, Mo., taking bids and opens same about June 13, brick, steel warehouse, 23rd and Hickory Sts. $50,000. J. V. Clark, 18th and St. Marys Sts., company engr.

N. Y., Binghamton—PLANT—See "Contracts Awarded."

O., Warren—FACTORY—Packard Electric Co. taking bids three 1 story factory buildings.

Pa., St. Marys—FACTORY—See "Contracts Awarded."

R. I., Bristol—SHED—Herreshoff Mfg. Co., 20 Burnside St., C. Haffenreffer, mgr., taking revised bids 1 story, 100x300 ft., steel boat storage shed, concrete found., Hope St. Private plans.

R. I., Providence—WAREHOUSE, etc.—June 15, by J. Peter Geddes, 2nd, archt., 840 Hospital Trust Bldg., 1 story, basement, brick, steel, warehouse and office, concrete found., Chestnut and West Elm Sts., for American Brass Co., P. A. Seaton, dist. mgr. 131 Dorrance St. Est. $225,000. Noted Apr. 2, C. D.—Apr. 9, E. N.-R.

CONTRACTS AWARDED

Calif., Acampo—WINERY—Cherokee Vineyard Assn., Acampo, concrete, wood frame, stucco and galvanized iron winery, to W. E. Lyons, 2009 Pacific Ave., Alameda, about $85,000, exclusive of equipment. Noted May 28, C. D.—Apr. 30, E. N.-R.

Calif., Corning—PACKING PLANT—California Olive Packers, Inc., 1 story, 30x70 ft., concrete, hollow tile packing plant, to B. H. Singletary, Corning, fixed fee basis.

Calif., Los Angeles—WAREHOUSE—Flower Realty Co. (United Parcels Service), 420 West 11th St., miscellaneous steel and iron for 3 story, 150x247 ft., rein.-con. commercial warehouse and garage, to Western Ornamental Iron Wks., 2037 Venice Blvd., $6,887***plumbing work, to J. M. Fickling, 247 North Larchmont Blvd., $10,799***electric wiring, to Golden State Electric Co., 1682 West Washington Blvd., $8,031***sprinkler system, to Curtis Automatic Sprinkler Co., 6627 McKinley Ave., $13,890. Grand total $39,607. Noted Mar. 13, C. D.—Mar. 19, E. N.-R.

Calif., Santa Cruz—SUPER-SERVICE STATION—Standard Oil Co., Engineering Dpt., 225 Bush St., San Francisco, 80x125 ft., steel frame super-service station, to H. A. Bridges, 1398 Lincoln Ave., San Jose. Noted May 11, C. D.—May 14, E. N.-R.

Calif., Vernon—WAREHOUSE—Certified Grocers of California, Fruitland and Loma Sts., 2 story, basement, 134x180 ft., rein.-con. warehouse addition, to Wm. P. Neil Co., 4671 East 49th St., Los Angeles, $86,000. H. T. Miller, 4814 Loma Vista St., Los Angeles, archt.

Calif., Woodbridge—WINERY—Del Rio Winery, c/o E. G. Ernst, archt., 9 West Cleveland St., Stockton, rein.-con., wood frame and galvanized iron winery, distilling plant, to W. E. Lyons, 2009 Pacific Ave., Alameda, about $85,000. Noted May 28, C. D.—May 21, E. N.-R.

Conn., Waterbury—PLANT—T. G. Smith Co., general contractors, reinforcing steel for 3 story, brick, steel, concrete plant addition, to Topper & Griggs, Inc., 200 North Main St., West Hartford, for Largay Brewing Co., Inc., 1090 Bank St.***structural steel, to New England Iron Wks., Inc., 1351 Dixwell Ave., New Haven. Noted May 28, C.D.—June 4, E.N.-R., under "Contracts Awarded."

D. C., Wash.—GARAGE and BUS SERVICE—Capitol Transit Co., 36th and M Sts. N.W., garage and bus service, to C. H. Tompkins, 1630 Connecticut Ave. N.W. Est. $75,000. Noted Jan. 27, C. D.—Jan. 30, E. N.-R.

D. C., Wash.—PLANT—Coco Cola Bottling Co., 400 7th St. S.W., constructing plant addition, to Davis & Platt, 6900 4th Ave. N.W. Est. $100,000. Contractors awarded separate contracts.

Ga., Albany—PACKING PLANT—Cudahy Packing Co., c/o A. W. R. Ruf, genl. purch. agt., 401 East Ohio St., Chicago, Ill., 126x433 ft., structural steel, concrete packing plant, to Piske Carter Constr. Co., c/o W. L. G. Mackenzie, Spartanburg, S. C. Est. $400,000. Noted May 7, C.D.—May 14, E.N.-R.

Ga., Tifton—PLANT—Tifton Coca Cola Bottling Co., c/o J. R. Holmes, pres., 2 story, basement, brick, tile bottling plant, to W. H. Spooner & Son, Tifton.

Ind., Logansport — FACTORY — Logansport Machine Co., C. Wilkinson, mgr., general contract 1 and 2 story, 60x60 ft. and 60x200 ft. factory addition, to Truscon Steel Co., 1315 Albert St. Extension, Youngstown, O., $50,000. Awarded June 1.

★ **Ill., Chicago**—STEAM POWER PLANT—Commonwealth Edison Co., 72 West Adams St., boilers for modernization of steam electric power plant, Fisk Street Station, to Babcock & Wilcox Co., 85 Liberty St., New York; 30,000 kw. turbine, to Allis Chalmers Mfg. Co., West Allis, Wis. Total est. $3,000,000.

Mass., Boston—TERMINAL—Eastern Massachusetts Street Railway Co., 38 Chauncy St., 3 story, basement, 64x114 ft., terminal. Separate contracts now being awarded; excavation, to M. McDonough Co., Broadway, Malden. Noted May 12, C.D.—May 14, E.N.-R. Awarded May 28.

Mass., Somerville—ASSEMBLY PLANT—Ford Motor Co., H. B. Hanson, supt. of Power & Construction, 3674 Schaefer Rd., Dearborn, Mich., air conditioning 1 story assembly plant, to York Ice Mchy. Corp., 957 Holden Ave., Detroit, Mich. Private plans. Noted Mar. 6, C.D.—Mar. 12, E.N.-R.

Mass., South Boston—FACTORY—Gerstein Cooper Corp., 1 West 3rd St., 1 story, basement, 45x85 ft., brick, concrete, steel factory addition, to M. Slotnick, 333 Washington St., Boston. Est. exceed $37,000. E. I. Leeds, 263 Harrison Ave., Boston, archt.

Mass., Woburn—WAREHOUSE, etc.—First National Stores, Inc., 5 Middlesex Ave., Somerville, 1 story, basement, 45x70 ft., brick, cast stone warehouse and store, concrete found., to C. A. Dodge Co., 2 Erie St., Cambridge.

N. J., Millville—FACTORY—Model Blouse Co., 114 Mulberry St., 2 story, basement, 56x100 ft. factory, to Raymond F. Goodwin, 101 North 7th St. E. C. Cassell, 1100 East Main St., archt.

N. Y., Binghamton — PLANT — Binghamton Fdry. & Mchy. Co., Floral Ave., constructing plant addition, Floral Ave., own forces. D. Holford, purchasing materials. Reinforcing steel, to Concrete Steel Co., 207 James St., Syracuse. To exceed $37,000. Private plans.

N. Y., Buffalo—BREWERY—Gilbert Klinck Brewing Co., West Bennett St., completing brewery and installing equipment, Bennett St., to C. H. Everitt, Inc., 295 Auburn Ave. Est. $150,000. J. Schultz & Son, 1370 Main St., archts.

N. Y., Buffalo—MALTING PLANT—Monarch Eng. Co., general contractors, Chamber of Commerce Bldg., metal lathing and plastering for malting plant, Childs St., for Francis Perots Sons Malting Co., 100 Childs St., to J. G. Davis Co., 80 Leslie St. Noted Apr. 28, C. D.—Apr. 30, E. N.-R., under "Contracts Awarded."

N. Y., Buffalo—WAREHOUSE—Howard Iron Wks., 281 Chicago St., warehouse, 281 Chicago St., to Boehm Bros., 245 Colorado Ave., contractor awarded structural steel, to Bethlehem Steel Co., Bethlehem, Pa. Western Express Co., Buffalo, lessee. Private plans. Noted May 6, C.D.—May 14, E.N.-R.

N. Y., Jamestown — BEARING MANUFACTURING PLANT ADDITION—Marlin-Rockwell Corp., 412 Chandler St., general contract 1 story, 50x150 ft., brick, steel addition to bearing manufacturing plant to be used for ware room and laboratory, Chandler St., to Warren Constr. Co., 335 Steele St., Jamestown. Est. exceeds $37,000.

N. Y., New York—GASOLINE STATION, etc.—Socony Vacuum Oil Co., 26 Bway., New York, constructing gasoline station, garage and shop, 100 East 13th St., separate contracts awarded. Est. about $37,000 with equipment. C. M. Spindler, c/o owner, archt.

N. Y., Troy—GARAGE—Stone Bros. Building Co., general contractors, 1814 Highland Ave., plumbing for garage at Coke Plant, for Hudson Valley Fuel Corp., 126 State St., Albany, to Goyette & Malone Co., 195 4th St.***roofing, to Central City Roofing Co., East Erie Blvd., Syracuse***painting, to A. E. Clement, 195 Columbus Ave., N., South Waterford***structural steel, to Clausen Iron Co., Inc., Tivoli St., Albany***reinforcing steel, to Albany Steel & Iron Co., Bway., Menands. Noted May 21, C. D.—May 28, E. N.-R., under "Contracts Awarded."

Pa., Corry—FACTORY, etc.—Aero Supply Mfg. Corp., 611 West Main St., Corry, L. Graham, vice-pres., 2 story, 40x80 ft., brick, steel factory and office building, 611 West Main St. Owner builds and buys materials. F. J. Fuller, 721 Commerce Bldg., Erie, archt. Noted May 21, C. D.—May 28, E. N.-R.

Pa., Erie—FACTORY—Erie Register Corp., W. Marrs, in charge of construction, 650 West 12th St., Erie, 2 story, 55x80 ft., brick, steel factory addition. Owner builds and buys materials. Private plans. Noted May 26, C. D.—June 4, E. N.-R.

Pa., Farmers Valley—POWER PLANT—E. B. Badger & Sons, engrs., 271 Madison Ave., New York, awarding separate contracts dewaxing plant and power plant, incl. 1 story, brick, steel building, for Quaker State Refining Co., W. R. Reitz, in charge, 552 Chambers Bldg., Oil City, brick stack, to Rust Eng. Co., Clark Bldg., Pittsburgh; 1,500 kw., 1,400 hp. high pressure steam boiler, to Babcock & Wilcox, College Hill, Beaver Falls. Noted May 18, C. D.—May 21, E. N.-R., under "Contracts Awarded."

Pa., Pittsburgh—PLANT—Crucible Steel Co., 2001 Oliver Bldg., 1 story, basement, 30x42 ft., brick, steel, pickling plant, Reedsdale St., to W. T. Grange Constr. Co., Keenan Bldg. Noted May 12, C. D.—May 14, E. N.-R.

Pa., Pittsburgh—PLANT—Butler Gas Products Corp., A. H. Steinbrecher, in charge, 40th St., general contract 2 story, 50x100 ft., concrete block gas products manufacturing building, 40th St. and AVRR. to Austin Co., Union Trust Bldg. Private plans. Noted May 29, C. D.—June 4, E. N.-R.

Pa., St. Marys—FACTORY—Stackpole Carbon Co., H. C. Stackpole, vice-pres. and mgr., 2 story, 65x130 ft., brick, steel factory, Tannery St., own forces and buys materials. Est. $80,000. Noted May 6, C. D.—May 14, E. N.-R.

Utah, Garfield—PLANT—American Smelting & Refining Co., 120 Bway., New York, sulphur recovery plant, converter flue, etc., day labor and separate contracts; 1,000 tons steel, to Minneapolis-Moline Power Implement Co., Moline, Ill. Est. exceeds $150,000. Noted May 27, C. D.—June 4, E. N.-R.

Wis., Beloit—FACTORY—Beloit Iron Wks., general contract 1 story, 75x190 ft., brick, steel machine shop addition, to Cunningham Bros., Beloit; steel, to Milwaukee Bridge Co., 3282 North 34th St., Milwaukee.

Wis., Milwaukee—MILL—Krause Milling Co., constructing 4 story, 31x60 and 1 story basement, 24 x 36 ft., brick, rein.-con. addition to mill, plain found., Burnham St., to Universal Constr. Co., 605 South 12th St.***reinforcing steel, to Concrete Steel Co., 176 West Wisconsin Ave.***steel sash, to Wauwatosa Fuel & Supply Co., 7700 Harwood Ave.

Wis., Milwaukee—PIPE STORAGE—A. O. Smith Corp., constructing foundation for 1 story, 86 x 100 ft. pipe storage building, North 27th St., to E. Steigerwald & Sons, 5310 West State St. Private plans.

Alta., Red Deer—PLANT—Central Alberta Dairy Pool, W. Adrian, mgr., constructing 1 story, 60x150 ft., concrete, brick milk condensing and canning plant, to Poole Constr. Co., 733 Tegler Bldg., Edmonton. $110,000, incl. special equipment. Noted Mar. 20, C. D.—Mar. 26, E. N.-R.

Ont., Toronto—FACTORY—J. Wilde & Co. Ltd., general contractors, 711 C.P.R. Bldg., roofing and sheet metal for two 180x300 ft. factory additions, Roselawn St., to A. B. Ormsby & Co. Ltd., 150 Van Horne St.***miscellaneous iron, to McGregor-McIntyre Ltd., 1139 Shaw St.***steel sash, to Canadian Metal Window & Steel Products Ltd., 160 River St.***elevators, to Otis-Fenson Elevator Co., 170 Bay St.*** reinforcing steel, to Burlington Steel Co. Ltd., 15 King St. W., and Steel Co. of Canada Ltd., 67 Younge St.***plumbing, heating and sprinklers, to Purdy-Mansell Ltd., 63 Albert St.*** wiring, to Ontario Electrical Constr. Co. Ltd., 66 Temperance St. Noted June 1, C. D.—June 4, E. N.-R.

Constr. News page 424

For official proposal advertising see Searchlight Section

†*Federal Government*